Hum

EKISTICS

ABSTRACTS ON THE PROBLEMS AND SCIENCE OF HUMAN SETTLEMENTS

183

ΟΙΚΙΣΤΙΚΗ

JULY • 1960

Serial Dept.
OCT 2 1961

PUBLISHED BY: DOXIADIS ASSOCIATES - CONSULTING ENGINEERS
24. STRAT. SYNDESMOU. ATHENS. GREECE • TEL. 22-091 • CABLES: DOXASSOC

EDITOR: PROFESSOR JAQUELINE TYRWHITT • 7 SUMNER RD CAMBRIDGE • MASSACHUSETTS • U.S.A.
PRODUCTION EDITOR: Mr. JOHN PIPEROGLOU. DOXIADIS ASSOCIATES • 24. STRAT. SYNDESMOU • ATHENS • GREECE

Addresses required by law:

Production Editor: J. C. Piperoglou
3, Pasteur St., Athens, Greece

Printer: N. Tiniakos
25, N. Halkidonos St., Athens, Greece.

HIB-GA 57
July 1960
Vol. 10: 57

E K I S T I C S

ABSTRACTS

o f

THE PROBLEMS AND SCIENCE OF HUMAN SETTLEMENTS

Published By

DOXIADIS ASSOCIATES
Consulting Engineers
24, Strat. Syndesmou
ATHENS, GREECE

Editor: Prof. J. Tyrwhitt, 7 Sumner Road, Cambridge, Mass., USA
Production Editor: Mr. J. Piperoglou, Doxiadis Assoc. 24, Strat. Syndesmou, Athens, Tel: 22.091

Cover Illustration: Apartments designed by Basil Spence for Glasgow.

5523-646

TABLE OF CONTENTS

EDITORIAL		3
ABSTRACTS ON HOUSING, PLANNING AND CONSTRUCTION		
Trade Centers and Tributary Areas of the Philippines (with illustrations pp. 6, 8, 9, 11)	Edward L. Ullman	5
The Effect of Transportation Forms on Regional Economic Growth	Benjamin Chinitz	12
Urban Traffic Problems	Town Planning Institute Research Committee	16
The Impact of Motorways on the Urban Environment	Frederick Gibberd	19
Vertical Flight: Some Observations on Its Significance for Our Cities	Patrick Horsbrugh	24
A Method for a Fast Evaluation of Traffic Characteristics (with illustrations pp. 33, 35, 36, 37)	Ernest Zipkes	28
Some Aspects of South American Planning (with illustrations pp. 39, 41, 43)	Sibyl Moholy-Nagy	38
Fighting the Rise: Consider the Hillsides and Their Needs	Grady Clay	45
Making Up for 200-Year Loss in Pittsburgh (with illustrations pp. 47, 49)	William Grant Swain	46
Following the Trail of the "Cat" (with illustration p. 51)	Ruth Jaffe	50
Redevelopment in the Gorbals, Glasgow (with illustrations pp. 53, 55, 57)	Paul Spence	52

Tests for Potential and Past Moisture Expansion of Ceramic Building Units (with illustration p. 60) — E. H. Waters, J. S. Hosking, and H. V. Hueber — 58

Workers' Housing — International Labour Conference — 62

APPENDIX

Recent Publications — 77

EKISTICS is compiled by Mrs. Gwen Bell under the direction of Prof. J. Tyrwhitt.

All enquiries regarding the contents of EKISTICS to:
J. Tyrwhitt, 7 Sumner Road, Cambridge 38, Massachusetts, U.S.A.

All enquiries regarding the distribution of EKISTICS to:
L. C. Stylianopoulos, Doxiadis Associates 24 Strat. Syndesmou, Athens, Greece.

NOTE: The figures below each title refer to the Universal Decimal Classificiation.

EDITORIAL

TRANSPORTATION

In an article on the Philippines by the geographer, Edward Ullman, one of the striking points that comes out is the very minor part played by roads in the formation of the nodal cities of this archepelago of islands. The same phenomena can be observed in Indonesia where the areas which traditionally have trade and customs in common are linked by sea routes and separated by mountains. In both places though highways are major connectors, they are a late and very costly innovation. We can leap from this thought to an article by Patrick Horsbrugh in which he speculates on the effect of Vertical Take Off aircraft and how this innovation is going to nullify the separators--in North America, the Great Lakes Region between Canada and the U S A. Benjamin Chinitz, an economist, makes a careful and useful contribution relating types of load, types of transport and their effect upon the size and shape of cities. He brings out the many forces which have induced decentralization but finally points out that air transport (like the sea transport of the past) tends to put a premium on centralization. It may be that in areas such as the Philippines or Indonesia road transport may prove to be a short and relatively unimportant interval between their traditional sea-linked pattern of settlements and a dawning air-linked pattern. This can already be observed in other areas where road access is difficult and costly, namely, central Peru and the arctic regions of Canada. In both, the air flight has become a common means of peasant transportation, whether to market or to hospital.

The critical problem for the western city of today is how to live with the road. This is courageously tackled by Frederick Gibberd who provides a kind of charter for measures of civic defense.

Finally, in the transportation section, we have a useful article by Ernest Zipkes from Iran on a simple and economic method of gaining reasonably accurate information about the type and amount of traffic using inter-city highways. It will remind many of the work of R. Hounsfield on simplified methods of establishing the quantities and directions of traffic flows within urban areas. Both men are (or were, regrettably, Hounsfield died young) traffic engineers but in both cases their schemes, so carefully worked out and helpful to the planner, are considered unorthodox and unrecognizable by their professional organization.

HOUSING IN THE LANDSCAPE

This second section presents five articles with the same theme--a human landscape, or a landscape for humans to dwell in. Sibyl Moholy-Nagy presents eloquent

critiques of many South American cities where landscape is especially powerful. She points out that cities in this area in the past either paid deference to a dominant landscape or built in bold contrast to it. In no case was it ignored as it has been today--with disastrous results. She ends with a scathing criticism of Brazilia whose plan is likely to be as abortive as the beautifully logical plans of the linear cities of Russia in the 20's which failed simply because Russia had not then entered into the technological era: the linear city is predicated on the availability of cheap mass transportation.

William Swain and Ruth Jaffe both inveigh against the missuse or the non-use of wooded, hillside urban slopes and Basil Spence produces an interesting high density urban landscape for the communal minded inhabitants of the most notorious slum in Glasgow. His innovation of "hanging gardens" with multi purpose functions ranging from grasp points to access to five escapes is highly interesting.

FACTORY HOUSING

A long and constructive report from a Conference held by the International Labour Office contains many valuable reminders of the urgency and the problems inherent in the direct provision of employers of housing for their workers. To start with, it states categorically that a worker who comes from a home that is no more than a hovel is unfitted to do a good day's work. Although clearly the members of the conference preferred to see tidy, permanent workers' housing they were aware that a large and important role could be played by housing built with "short life materials" and they point out that this can often mobilize resources at present unused,and thus contribute in several ways to raising standards of living.

On two points their recommendations seem short-sighted and out of touch with reality. They emphasize the need for house-building programs to concentrate first of all on houses for large families. Urban surveys and housing costs have repeatedly shown that a large number of small families live (a) unwillingly in semi-obsolete larger houses, and (b) that it is totally impossible to finance new houses for large families with any practicable hope of ultimate reimbursement. For the large family the roomy "second-hand" house offers far more in the way of amenity than anything that can be newly built for him. Whereas the "wrinkly-out" of small families at present "over-housed" can normally be achieved at relatively little cost. The second omission in this excellent report is any reference to the fact that the poorer the worker the more important is the provision of public facilities in the immediate vicinity. We all know that "housing is not enough" but this is trebly true for the low-paid industrial worker. At the very end (paragraph 36c) lip service is paid to town planning considerations and there is a systematic and well considered list of things other than housing which must be provided for at a very simple level. But the implied assumption that these can appear after the houses have been erected is as crass as the sin of destroying landscape which then has to be recreated, as pointed out in earlier articles.

Ullman, Edward L.
TRADE CENTERS AND TRIBUTARY AREAS OF THE PHILIPPINES
Geographical Review, April, 1960. Pages 203-218. Maps, Illustrations.
711.45 (9)

1. Dr. Ullman, professor of geography, University of Washington, Seattle, Washington, prepared the field work for this study, while on a mission sent out by the Stanford Research Institute in 1956 to make a six-month transportation survey for the Philippine National Economic Council and the International Cooperation Administration. This resulted in a seven-volume report by R. O. Shreve, H. E. Robison, R. E. Arnold, J. W. Landregan, J. A. McCuniff, and E. L. Ullman, "An Economic Analysis of Philippine Domestic Transportation" (Stanford Research Institute, Menlo Park, Calif., 1957).

2. An integral, but generally ignored, feature of the geography of an area is the delimitation of nodal or functional regions--specifically, tributary areas or spheres of influence. In a sense these are the real human regions. To establish a definitive set of such regions is difficult because of overlapping functions, progressive change, and the lack of precise data. For this reason even most well-developed countries have poor or no maps of this fundamental phenomenon. However, by judicious use of various indicators, a useful preliminary framework can be established.

3. Procedure. Formidable difficulties hamper the delineation of a hierarchy of nodal centers and tributary areas, especially in underdeveloped areas. The Philippines are no exception. In the Philippines, as in most other underdeveloped areas, increased commercialization and the rapid building of roads are apparently creating a firmer set of organizational regions. But it is an enormous assignment, even with good data, for a single research worker with limited time to cover a country of large and scattered extent with 22 million people, about two hundred major trade centers and thousands of agricultural villages (see Figure 1, page 6).

4. Two key problems confront the researcher: (1) establishing objective criteria for classifying the centers; and (2) finding objective data for bounding the tributary areas. In the Philippines census population figures are poor indicators of center size because population counts are made for poblaciones, political divisions that correspond poorly to the actual urban centers. On the other hand, one new source of data is available: maps (on scales ranging from 1 : 200,000 to 1 : 400,000 prepared by the Bureau of Public Highways) of traffic flow on the roads of each of the 52 provinces for the years 1953 and 1954. Not only were these maps the principal basis for delimiting trade areas, but they were also a key to the recognition and classificiation of centers by the concentration of traffic flows. Since the main traffic on these roads is buses, the procedure in delimiting areas was similar to that followed by F. H. W. Green for England and Western Europe and Sven Godlund for Sweden.

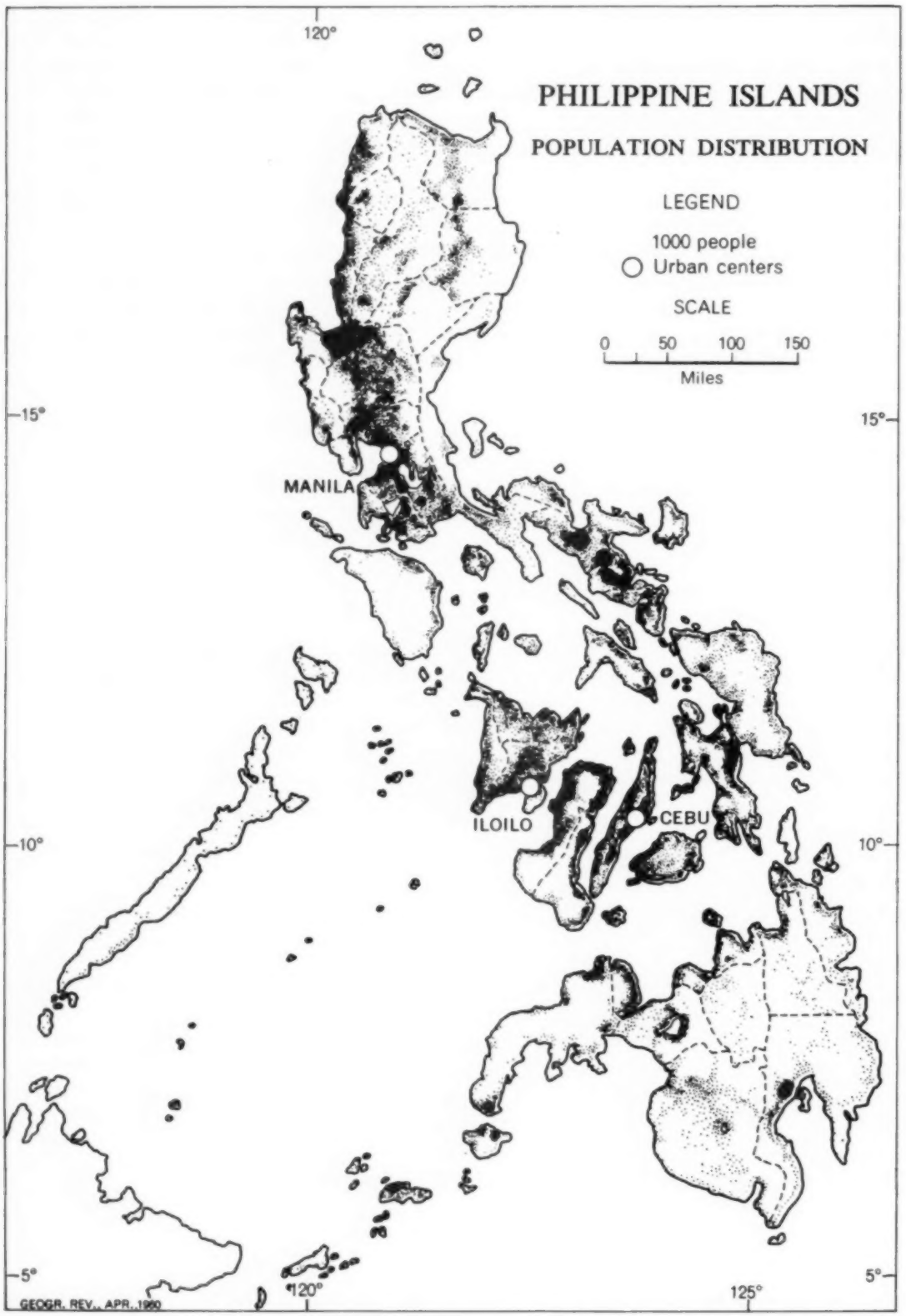


FIG. 1—Population distribution, 1950. Source: Philippine Studies Program, University of Chicago.

5. In addition to traffic flow, other consistent island-wide data used to classify the centers were branch plants and warehouses for Coco-Cola (the one commodity distributed everywhere!); headquarters, main installations, and depots for the three oil companies distributing throughout the islands; provincial capitals; Chinese Chambers of Commerce (since the Chinese control most of the retail trade); and, as a poor indicator, population. A variety of specific data were also of minor use for individual localities: for example, port facilities, military installations, mines, saw mills, factories, and sugar centrals. For Manila several other unique indicators were used.

6. As preliminary field work for delineation of the trade areas throughout the islands, merchants, presidents of Chinese Chambers of Commerce, and other businessmen in each major center were asked to delimit the trade area of their center for their specialty. Owners or managers of small stores in rural barrios, at the edges of the trade areas, were next interviewed and asked the same questions. The combined results were then compared with the Bureau of Public Highways traffic-flow maps, which were based on traffic counts. The correlation was in general remarkably close. The boundary of a trade area coincided with the traffic divide between centers. Because of the close correlation, the traffic-flow maps were also used for numerous places not visited personally. (See Figure 2, page 8.)

7. The main base for the trade areas was thus provided by the traffic-flow maps. For some areas precise delimitation was difficult because the traffic counts were not sufficiently closely spaced. For some areas without extensive road networks, water traffic between ports furnished clues. Launch routes, stream patterns for native canoes, and trails were also used as guides. In still other cases, bus routes and other data provided additional information.

8. The Hierarchy of Centers and Their Tributary Areas. Five types of centers were recognized (See Figure 3, page 9):

National center: Manila (population 1,700,000)

Interregional Centers: Cebu, Iliolo, Davao, and (partial) Zamboanga (population about 50,000 - 200,000)

Major centers: centers (33) of large trade; two of them provincial capitals; most have soft-drink warehouses and gasoline depots (population 10,000 - 40,000)

Secondary centers: (34) similar to major centers but less important (population 5,000 - 25,000)

Minor centers: (126) small retail and social centers (population 1,000 - 5,000).

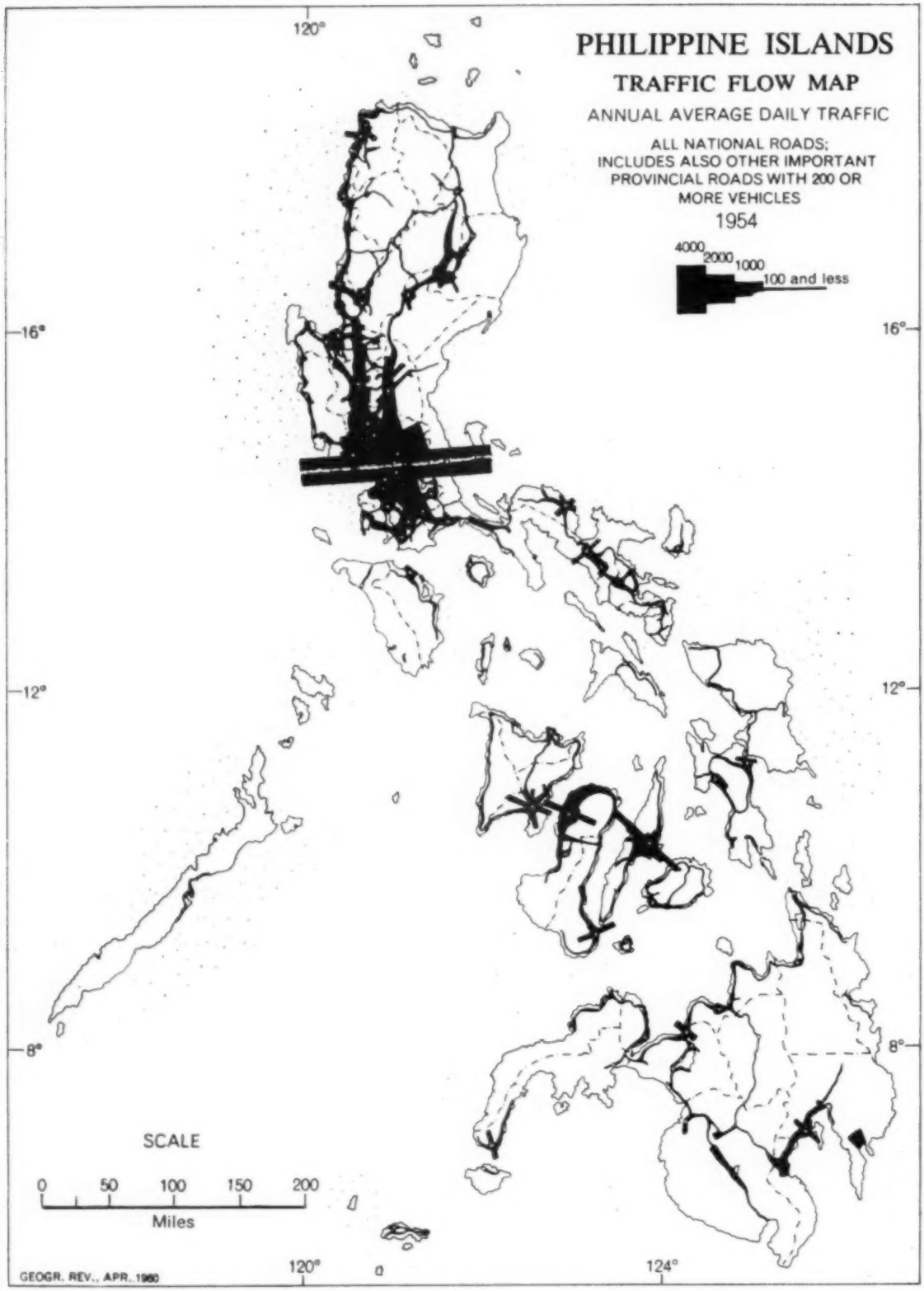


FIG. 2—Traffic flow, 1954. Source: Bureau of Public Highways, Manila.

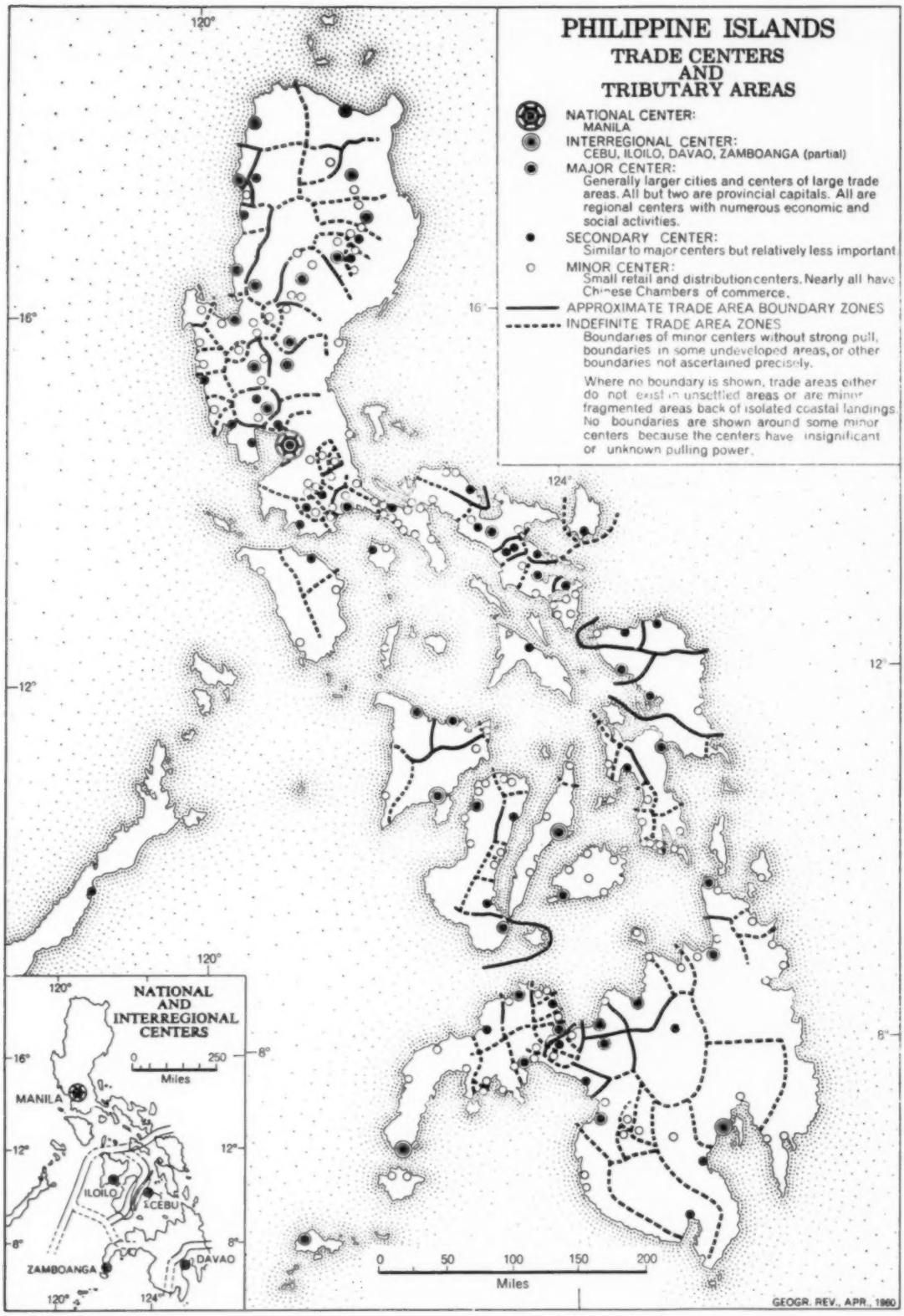

PHILIPPINE ISLANDS
TRADE CENTERS
AND
TRIBUTARY AREAS
NATIONAL CENTER:
MANILA
INTERREGIONAL CENTER:
CEBU, ILOILO, DAVAO, ZAMBOANGA (partial)
MAJOR CENTER:
Generally larger cities and centers of large trade areas. All but two are provincial capitals. All are regional centers with numerous economic and social activities.
SECONDARY CENTER:
Similar to major centers but relatively less important
MINOR CENTER:
Small retail and distribution centers. Nearly all have Chinese Chambers of commerce.
APPROXIMATE TRADE AREA BOUNDARY ZONES
INDEFINITE TRADE AREA ZONES
Boundaries of minor centers without strong pull, boundaries in some undeveloped areas, or other boundaries not ascertained precisely.
Where no boundary is shown, trade areas either do not exist in unsettled areas or are minor fragmented areas back of isolated coastal landings. No boundaries are shown around some minor centers because the centers have insignificant or unknown pulling power.
NATIONAL AND INTERREGIONAL CENTERS
0 250
Miles
MANILA
ILOILO
CEBU
ZAMBOANGA
DAVAO
0 50 100 150 200
Miles
GEOGR. REV., APR., 1960

FIG. 3—Trade centers and tributary areas, 1956.

9. The Development of Service Areas. As roads and commercialization increase in the Philippines, a rational framework of service areas is apparently developing: smaller centers and isolated coastal landings are giving way to major centers, which are extending their hinterlands by road (See Figure 6, page 11). An excellent example is found on the island of Samar (last center), where a trans-island road has recently been completed from Catbalogan, the capital, to the east coast. As a result, ship service to minor centers and coastal landings on the exposed east coast has been discontinued, and the whole eastern zone has become part of Catbalogan's hinterland. The same pattern will probably occur elsewhere. The truck and the auto are more efficient for local distribution than the ship. It is also sounder practice to concentrate port development in one major port for each island or major region than to try to maintain many small, poorly equipped ports. The system is in a state of flux in many parts of the islands, and some areas are still virtually unsettled and unorganized.

10. Along routes in many settled areas spacing is fairly regular and fits well the fundamental tenet of a central-place system: the size and distance apart of centers are a function of the amount of productive land. This is exemplified in the rather regular spacing of centers north of Manila and into the Cagayan Valley of northern Luzon (See Figure 3, page 9), with their trade areas elongated at right angles to the road, as was to be expected.

11. In the Philippines five size classes of trade centers were established, a common and convenient breakdown all over the world. The first two, national and interregional centers, are clear, though the lower end of the second merges into the third. The third and fourth categories, however (major and secondary centers), might well be considered one, and only four classes would then be recognized. One might well speculate that in an underdeveloped and poor country such as the Philippines there is no third-order center; or rather, that all the centers are at least one grade lower than in rich, well-developed countries. Furthermore, in all primate-city countries, whether underdeveloped, like the Philippines, or well-developed but small, like England, a second category is missing. Whether it will develop as the country develops is unknown. In the Philippines, no evidence points in this direction at present.

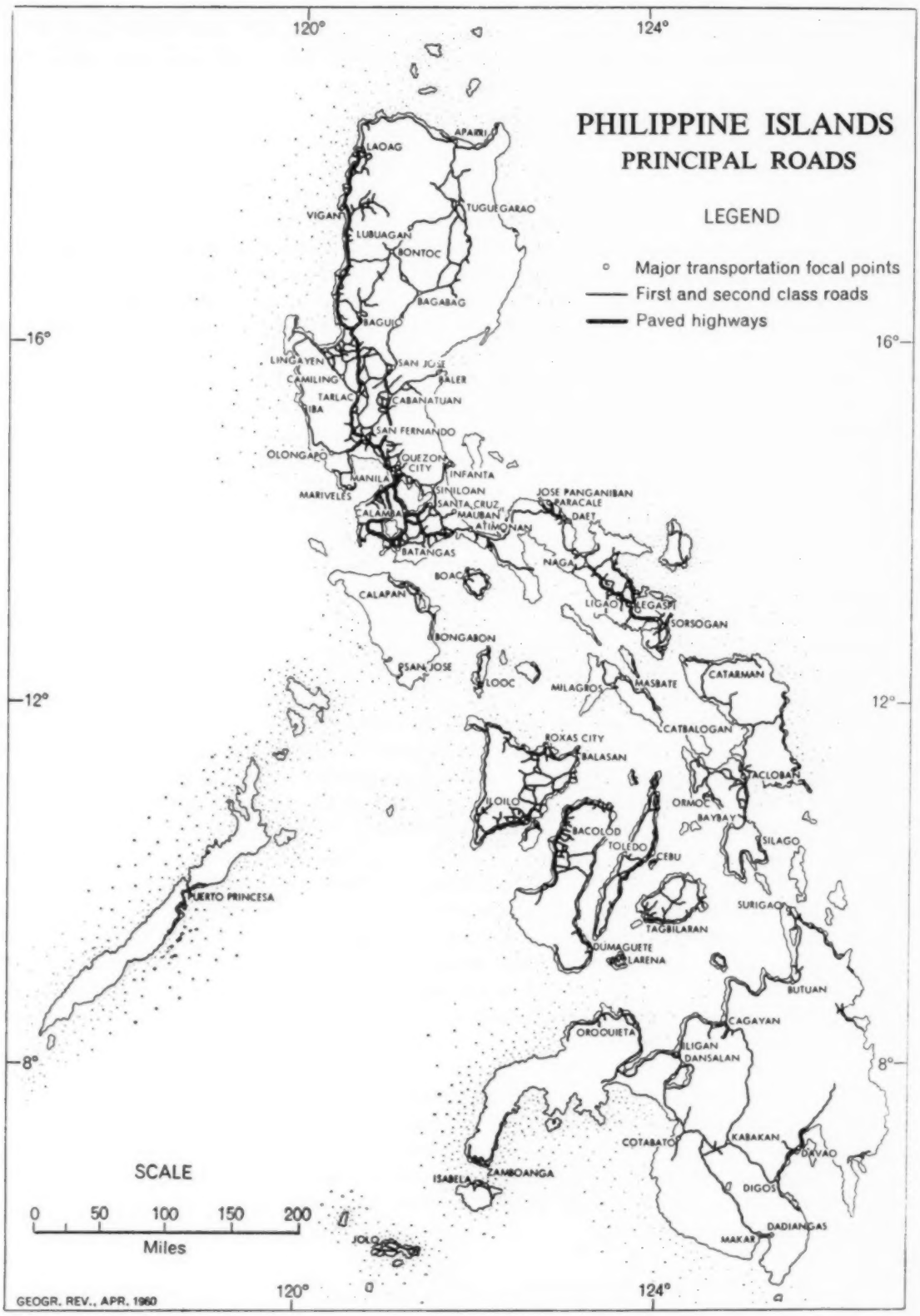


FIG. 6—Principal roads. Source: First- and second-class highways, Philippine Studies Program, University of Chicago, and Bureau of Public Highways, Manila (data *ca.* 1952); paved highways, author's observations, 1956.

Chinitz, Benjamin
THE EFFECT OF TRANSPORTATION FORMS ON REGIONAL ECONOMIC GROWTH
Traffic Quarterly, April, 1960. Pages 129-142.
711.7: 711.2 (73)

1. Dr. Chinitz is Associate Professor of Economics at the University of Pittsburgh, and Associate Director of the Economic Study of the Pittsburgh Region. This study was initiated last year by the Pittsburgh Regional Planning Association under a combined grant from the Ford Foundation and the Regional Industrial Development Corporation of Pittsburgh, and directed by Dr. Edgar M. Hoover, Professor of Economics at the University of Pittsburgh. Research underlying this article was done for the New York Metropolitan Region Study which Dr. Chinitz participated in previously, and will be part of his forthcoming book, " Freight and Metropolis" to be published by Harvard University Press in 1960. Although the research deals particularly with the Eastern part of the United States, it is general enough in scope to provide indications of possible growth trends for areas throughout the world as they are effected by modern transportation forms.

2. For at least a hundred years or more, manufacturing has grown at a more rapid pace in the rest of the U.S.A. than in New England and the Middle Atlantic States. Each of these areas has suffered a marked decline in its share of national manufacturing employment. Moreover, all other areas of the country--including those whose population growth has been comparatively slow--have gained in manufacturing at the expense of the heavily industrialized Northeast. In short, manufacturing has pulled away from the Northeast faster than population, and has come to be much more evenly distributed throughout the nation. In the twentieth century, the number of manufacturing workers per 1,000 population has declined in New England, increased but slightly in the Middle Atlantic region, and increased substantially in almost all other areas.

3. If we look behind these basic shifts, we can discern two phases, with transportation playing rather a different role in each. The first phase, covering the westward and southward drift of manufacturing during the latter half of the nineteenth century, occurred when the prevailing tendency in many industries was toward greater geographical centralizing of production facilities. That is, while manufacturing as a whole was coming to be more evenly distributed around the nation, individual industries were being drawn more tightly together. The regions that grew fastest during this period did so by attracting certain industries on a large scale.

4. In the twentieth century, however, the trend has been toward a more evenly distributed production in relation to the distribution of population in a large number of individual industries. The southern and western regions, that have increased their share of the nation's manufacturing employment in recent decades, have done so primarily by increasing their shares of many industires which were and still are concentrated in the older industrial areas.

5. Transport Costs and Other Costs. One reason that the trend toward concentration of industries has been reversed is that the rapid relative decline of transport costs in the nineteenth century did not extend far into the twentieth century. However, the trend in average revenue per ton-mile is an imperfect measure of the trend in transport costs. Any such average revenue figure not only reflects a change in the price of some given transport service but also a change in the nature of the transport services performed over the years. There have been two significant changes in transport services, each of which would tend to depress average revenue per ton-mile and hence give it a downward bias as a measure of the change in transport costs. One of these is the increasing average haul; the other, the decline in relative importance of less-than-carload traffic.

6 By comparing the revenues received in successive years for shipments with the same characteristics as to commodity and length of haul, it is possible to derive a more accurate measure of the changing level of transport costs. The results of such a test for the period 1947 to 1954 show that the level of freight rates rose forty-one percent during that period, while the level of wholesale prices rose fourteen percent.

7. As transport costs rise, relative to other costs, producers seek ways of avoiding transport costs, even at the expense of higher production costs, by locating closer to the market. But suppose that getting close to the market means getting away from sources of raw materials? Will this not stop the trend? Here, too, we find that developments in transport cost have favored market orientation.

8. Raw Materials versus Finished Products. Freight rates on raw materials and semi-finished goods are generally lower than freight rates on finished products. In part, the reason for this is that those who price freight services assume that the demand for transport by shippers of low-value products is quite sensitive to the cost of transport. But in part, the reason is simply a reflection of lower costs. A ton of coal is easier to handle than a ton of steel, and a ton of steel is easier to handle than a ton of automobiles. This gap in freight rates for different types of products has actually widened over time. From 1947 to 1954, it was found that the rates on products of mines has risen less rapidly than rates on manufactured products.

9 So far, two factors have been adduced that have worked toward greater market orientation of industry: the rise of transport costs relative to other costs, and the rise of transport costs on manufactured products relative to transport costs on raw materials. But a third and more important factor was the rise of transport costs on long hauls relative to transport costs on short hauls.

10. Long Hauls versus Short Hauls. The shipment of freight involves two kinds of costs: terminal and line-haul. Terminal costs are those incurred on the trip between origin and destination, and are roughly proportional to distance. But terminal costs do not vary with distance; they constitute a more or less fixed cost whatever the

length of the trip. Consequently, total costs per mile go down with distance, because the terminal costs are spread over a longer trip.

11. Terminal costs depend on many factors, including size of shipment and type of commodity. But many cost studies have demonstrated that terminal costs are higher for water carriers than for rail carriers, and higher for rail carriers than for motor carriers. When viewed in these terms, it is clear that the sequence of technological development has reduced terminal costs more than it has reduced haulage costs. As a result, the cost of short hauls has fallen relative to the cost of long hauls. And in this respect the most important event has been development of the truck.

12. Even assuming that the motor carrier's rate structure did not differ greatly from the railroad, still the shipper is offered a service superior to rail, particularly for the short haul. The motor carrier is a time-saver and also offers direct pick-up and delivery service to the shipper. The truck would thus have reduced the relative cost of short-haul transportation even if it had not disturbed existing relationships between tariffs for rate and distance. However, the railroads have attempted to combat motor-carrier competition by rate adjustments which has resulted in a change in the rate-distance relationship favoring the short haul.

13. Large Shipments versus Small Shipments. Trucking promoted the decentralization of industry, not alone because of its impact on short-haul transport costs, but also because it brought down the cost of shipping in small lots relative to the cost of shipping in large lots. By doing so, it cut into one of the advantages of the large-scale producer--the advantage of receiving materials in large lots at lower average freight costs.

14. The disadvantage suffered by the receiver of small lots of merchandise has changed dramatically with each new phase of the transport revolution. The three major modes of transport--water, rail, and truck--have had distinctly different impacts in this respect. As long as the movement of goods depended on vessels with a total capacity running into thousands of tons, the small producer was at a hopeless disadvantage in comparison with the large producer, whose needs more closely approximated the capacity of a vessel. The advent of rail reduced the discrepancy, offering the delivery of individual cars with an average capacity of thirty tons. Introduction of the truck with its capacity of about ten tons reduced the spread further. As a result, the establishment of plants on a smaller scale, closer to the market, became feasible.

15. Conclusions. All of the transport trends described so far have had the same effect, with respect to the location of industry. They have encouraged a greater degree of market orientation. Partely as a consequence of these shifts in the structure of transport costs, there has been a marked tendency for industrial employment to become more evenly distributed around the country in proportion to population. On the whole, this trend has favored the relatively under-industrialized areas of the nation.

16. However, one major development in recent decades--the spread of air freight--has favored the older manufacturing areas. Without doubt, with air freight the longer the haul, the greater the boon. Thus it is a factor tending to favor the concentration of industry.

17. Even so, air freight is not altogether favorable to established centers. The increasing speed of freight transport has worked against high-wage areas. With the aid of air freight, manufacturers have strayed as far as Puerto Rico and even Japan, in search of cheap labor.

Town Planning Institute, Research Committee
URBAN TRAFFIC PROBLEMS
Journal of the Town Planning Institute, Vol. xlvi No. 2, January, 1960, Pages 39-43.
656 (100)

1. The Research Committee of the Town Planning Institute has recently had occasion to consider what guidance is needed by local authorities on the subject of the investigation of urban traffic problems. Their first three terms of reference are of general interest, applicable to any part of the world, while the fourth relates those to specific problems which are occurring in England today. Only the major conclusions from the first three sections will be abstracted as interest to the readers of EKISTICS. Following are the terms of reference:

1. Techniques for investigating urban traffic problems.

2. Means which can be used to improve traffic flow and safety.

3. Methods of assessing the relative merits of suggestions under (2) above.

4. Examples of opportunities for the day-to-day control of development which have been lost through absence of traffic data or lack of an overall plan based on traffic studies.

2. Techniques for investigating urban traffic problems. A local authority will need to have certain basic data about its traffic before it can even begin to carry out detailed investigations. The following main headings, are suggested:

a. The pattern of traffic movement in the surrounding region.
b. The volume of traffic on its main approach roads.
c. The characteristics of traffic on its principal roads.
d. The seasonal, weekly, daily, and hourly variations in flow at its nodal points.

3. The general background of information tells nothing of what the traffic actually does in urban streets. A second stage is needed determining the appraisal of characteristics of the traffic:

a.	Through traffic	routes, types, volumes, origin and destination.
b.	Terminating traffic	destination, duration of stay, adequacy of car parks.
c.	Commercial traffic	facilities for unloading, routes and timings.
d.	Criss-cross traffic	the regular beaten tracks and habits of traffic moving within the town.
e.	Traffic accidents	accident points, highway defects.

f. Traffic generators — bus and railway stations, markets.
g. Journey-speeds — cross-town and in/out journeys at normal-peak hours.

4. For work in town centres there will additionally be a need for information about pedestrian movements. The movement of pedestrians seems so often to be dismissed either as of little account or so difficult to measure as to be excluded from survey. In fact, it is common experience that the most carefully designed schemes for free traffic flow fail abjectly if the complex but nonetheless pertinent factor of the pedestrian is not fairly evaluated.

5. For the above list of surveys, the methods used to attain the data should have the following characteristics:

a. Simplicity.
b. Minimum of equipment.
c. Applicable by local authority (no extra or specialized help needed).
d. Ease of analysis.
e. Ease of checking.

6. Means which can be used to improve traffic flow and safety. It is in this area that the planning profession might make its greatest and most appropriate contribution. This would be not a review of corrective measures but a setting down of principles which should govern town design and town adaptation with specific reference to the achievement of free traffic flow and safety. This would consider the zoning of land and the design and siting of buildings in relation to the pedestrian and vehicular movements which they will engender, enabling them to exert influence as design factors and therefore avoiding the creation of known traffic hazards. The specific issues discussed include ring roads, zoning of land and siting of buildings which generate traffic, segregation of traffic, and parking.

7. Origin and destination and volume surveys will reveal whether a ring road would result in a worthwhile improvement in local traffic conditions and if so, whether the roads should encircle the urban area completely or partially. Volume and direction of traffic at junctions will influence the design of junctions so as to maintain the efficiency of both ring and radial roads.

8. It is a most important function of urban design to arrange land uses in such a way as to minimize the transport of passengers and goods. One of the chief objections to the excessively large city is the uneconomic daily surge of workers between home and work, necessitating the provision of much transportation equipment that can only earn its keep during the relatively short peak hours. Much of this could be obviated by a better relationship between home and workplace. Decentralization of employment must go hand in hand with decentralization of population. On the other hand, it may be desirable, in central areas, to encourage residential development instead of other uses liable to generate more traffic.

9. There is need to both segregate through traffic routes around residential areas and the different classes of traffic itself. This latter aspect will increase towards the centre of a town as the density of total traffic increases, however, the importance on this is according to the predominant activity of the town, varying between towns.

10. Parking creates unique problems in the central area, outside the central area, and within the residential areas. In the central area it is logical to differentiate between short and long term parking. A pricing system for parking can have a dual purpose, other than helping to meet the cost of off-street parks. Firstly, it helps to ration available space, secondly, through a graduated scale, it is an instrument for differentiating between short-term and long-term facilities. Outside the central area, parking is usually concentrated at individual premises, such as industry, public houses, shopping centres, churches, cinemas, etc. Parking space will need to be provided by each establishment for its own use according to the particular standards of each type of premises. On the fringes of central areas, it may be necessary and feasible to arrange for all-day parking connected with central area uses.

11. In residential areas, the Radburn type of layout reduces the length of road in relation to the number of houses. To do this it is necessary that the road be reserved exclusively for moving traffic and that all parking spaces should be adequate for all kinds of vehicles and located where it will be used in preference to the roadway.

12. Methods of assessing the relative merits of suggestions made above. The efficacy of such methods as may be recommended, in terms of economics, free traffic flow and safety, is probably capable of fairly accurate assessment. It must all be assessed as to its effect both upon civic design and urban living. Contemporary urban life demands that the wheeled vehicle should be able to penetrate into almost every cluster of buildings and to move around freely between them. This is not, however, to say that it must completely dominate them. The price of free traffic movement in towns can be high in almost any terms: the Committee therefore represents most strongly that the whole atmosphere of the urban scene and the whole structure of urban living should not be subordinated to extravagant demands based on wheeled vehicles.

Gibberd, Frederick
THE IMPACT OF MOTORWAYS ON THE URBAN ENVIRONMENT
The Architects' Journal, March 24, 1960. Pages 464-466.
711.01 (100)

1. Frederick Gibberd prepared this paper for a joint meeting of the Royal Institute of British Architects and the Institute of Civil Engineers in London, during March, 1960. A parallel paper was presented by an engineer. Editorially, The Architects' Journal referred to this joint meeting and each of the two papers. The first two paragraphs are extracted from this lively editorial commentary, and then are followed by an abstract of Mr. Gibberd's paper.

2. The lack of common understanding between engineers and architects emerged not only in the papers, but in the subsequent discussion which, it must be said, did credit to neither learned institution. Mr. P. V. Marchant, who supported Mr. Nicholas's paper (City Surveyor, Engineer and Town Planning Officer of Manchester), unconsciously betrayed the width of the gulf between the professions when, after suggesting that motor roads should be built over railways "to avoid architects' complaints," he said that engineers always welcomed architects in the "clothing" of bridges and the design of lighting columns. Only in the last minute of the meeting did an architect, Professor Gardner-Medwin, point out that it was a popular misconception to regard architecture as sugar icing to be put on after the concrete cake had been cooked, and recalled that the architect to the George Washington Bridge in New York had advised that the best treatment was to leave it alone.

3. Unfortunately, Frederick Gibbert's paper--which Sir Herbert Manzoni, the newly elected President of the ICE, described as "thought-provoking"--failed to provoke much thought. One engineer suggested carrying motorways over cities on suspension bridges as much cheaper than sunk roads, and wouldn't sterilize any land except at the piers. Mr. Nicholas had the last word, and said that anyone who was producing an urban road today without complete segregation of pedestrian from vehicular traffic was missing the bus. None of the assembled architects and engineers, who are engaged on schemes lacking just such segregation, were seen to blush.

4. Frederick Gibberd: I intend to substitute the word motor-cars for motorways, as they are only one kind of road and if we isolate the word "motor-way" it tends to acquire a kind of mystique. It is necessary to consider the kind of urban environment in which architecture can flourish; the aesthetics of town design, which is quite a long way from motorways. We may take it that the future growth of the motor industry, relative to the present growth of rural and urban development, will ultimately end in disaster; that the situation is so complex that there can be no one formula or ready-made solution; and that the problems are so diverse that each profession concerned with the urban environment must make a contribution--this is no case for "going it alone."

5. Motorways and the Architect. The architect is conscious that, as a thing in itself, the motor way is a quite new design form and he has nothing but admiration for the dynamic lines of its carriage-ways and the fantasy of its multi-level intersections. His only interest in its design is likely to be with bridges and here he is content to take a secondary role. Our first axiom might be as follows: The design of motorways is the function of the road engineer and the landscape architect working in collaboration.

6. Motorways in Cities. When the motorway enters the built-up area the architect loses his enthusiasm. It is abundantly clear that motorways in the city can generate urban sprawl which demands more cars which, in turn, demand more motorways until ultimately we arrive at the destruction of all civic values. The huge scale of the motorway and its function make it impossible to associate it with groups of buildings. Its uncompromising character completely severs one area from another, making a monogeneous city impossible. The motorway is a landscape form; the term urban motorway, now being bandied about, associates two diametrically opposed functions and might well be abandoned. The motorway has no place in the small town. In the large urban concentrations it can only be allowed after all other alternatives have been tried. The architect's second axiom will then be something like this: The term 'urban motorway' is a contradiction in terms and no motorway may penetrate an urban area unless all other alternatives have been examined and found wanting.

7. Road Design Subservient to Town Planning. We have now all learnt the lesson of Mr. Alker Tripp and other traffic experts, that the old all-purpose road--building frontage, vehicles, pedestrians--is defunct. We have learnt, too, that, interlocking with this structure, must be a pattern of car parks or garages designed to draw the motor off the heart of the precincts. The conclusion we read is, therefore: Roads are one part of the town's organism and their design is subservient to town planning.

8. The Architect and Road Engineering. The intrusion of the motor-car into the urban scene has introduced many ugly objects and few of those objects have been given any formal relationship to other objects. The situation will not change until it is recognized that the problem goes beyond engineering. The background to the urban scene is architecture. You can have a town without trees, without lamp posts, without roads, but you cannot have one without buildings. The dogma that summarizes these views may be stated as follows: All problems of road engineering within the urban environment are inseparable from architecture and their solution requires the collaboration of the architect.

9. Road as a Part of Urban Space. The motor-car has totally changed the architect's attitude to the relationship of roads and buildings. Cars cannot be left to meander with pedestrians over the free medieval space. Neither can they be canalized into seventeenth century axial vista lines without splitting asunder the architectural compositions

composed about that axis. A new solution is required and that solution must dissociate the building composition from the path of fast or dense traffic streams. The purpose of the walls of a building is to enclose space, but they also define external ones. They are the planes out of which the urban scene is made; they are the indispensable element in town design. The essential quality of an urban space, that of being a place to be in, is destroyed when a road passes through it, as it is the nature of a road to lead you somewhere else. Traffic divides the space into two, and the road structure destroys the floor of the space by carving it up into one-directional planes and lines: the effect is that of running a footpath through a living room. Furthermore, the modern road and its junctions are exceptionally wide elements and tend to open up or break asunder the spatial pattern with disastrous results. No road may pass through an urban composition formed by the walls of buildings.

10. Pedestrian Cores. What this, in effect, amounts to is composing new centres around a pedestrian core and, in existing centres, slowly replacing the motor-car by the pedestrian. There are now no difficulties of any kind in designing a new centre as a pedestrian precinct. The complement of the previous axiom is then: All new shopping and civic centres should be designed round a pedestrian core.

11. This is perhaps obvious enough but we still find proposals for neighbourhood centres with a traffic street down the middle and several new civic centres have appeared recently with huge buildings composed around grandiose approach, drives and car parks, thereby encouraging the motor-car to penetrate to the one place it should not be. Let us get into the habit of thinking about existing centres in terms of the pedestrians and agree that: The objective in the redesign of existing centres is to restore the pedestrian to the core.

12. Assessing Pedestrian Flow. In considering the impact of the motor-car on the city we will think more in terms of relegating the road in importance, not increasing it. Instead of beginning at the perimeter and trying to discover how to get cars to the centre, we must begin with the core, have the introduction of the pedestrian as the objective, and the more cars that are kept away the better. Traffic surveys require a complementary survey into pedestrian flow.

13. Traffic-intersections and Building Frontage. In considering urban space, the architect subconsciously excludes all those large, functional spaces with which buildings should not be associated, such as traffic intersectins. Whilst few people would attempt to compose buildings round a fly-over, it is still common practice to try to relate them to roundabouts and similar intersections. A traffic island is functionally unsuitable for building frontage and the architectural composition should turn away from it. The island is a quite useless space as such and should not have visual significance. We then have the principle: Major traffic intersections are spaces around which it is undesirable to compose buildings.

14. The Parked Car and Urban Space. The parked car destroys an urban space because it occupies it. The parked car and its revolting trappings of signs and symbols must be taken out of our urban spaces, to make them civilized again. The floors of urban spaces must be redesigned for the pedestrian and not the motorist to come to rest.

15. The Carriage-way Exclusively for Movement. We are all suffering from the psychology of the "Queen's Highway," the all-purpose surface on which it was once possible, short of highway robbery, to behave as one liked. It is not possible to leave a car on the carriage-way of motorways; it should not be possible on the carriage-ways of the central area. Carriage-ways in central areas are exclusively for moving traffic.

16. The architect would expect to find at every point of access to the motorway or trunk road a car park and service areas associated with a public transport system; he would expect to find car parks at railway and bus stations; and he would also expect them on the edges of areas of special use such as an industrial estate or town park. Road plans for central areas must include detailed proposals for the provision of car parks.

17. Effective Public Transport Essential. If the use of private cars increase together with a decrease in the use of public transport, the traffic problem will become even more intolerable. No solution is likely to be found unless full use is made of a modernized public transport system for the mass movement of people in centres.

18. Theoretical Central Area Circulation. Somehow or other vehicles have got to get to the buildings by service or distributive roads. The distributive roads cannot be dissociated from building frontage. But that frontage need not be the chief building frontage: that primarily used by the pedestrian as in a shopping parade. The distributive roads will run behind the buildings, and from them service roads or courts will give access to the service areas of the buildings. Distributive roads must never form a principal building frontage.

19. The Need for Comprehensive Redevelopment. In the past new roads were in part financed by the building frontage they provided. Money has to be found to pay for the necessary new roads which have no building frontage on them. The solution to traffic problems in large and dense centres calls for comprehensive redevelopment.

20. Upper-level Pedestrian Ways. Two-level circulation is worth having simply for the pleasures it gives of different views of the civic scene. If it is worth having for its own sake, the more so when it helps solve a traffic problem. Piccadilly has a pedestrian subway on which shops are sited and there are many other examples. The advantage of putting the pedestrian below the car is that less headroom is required and probably less space. Nevertheless, most architects are uncompromisingly against subways because the architectural scene is the necessary background to urban life and an unnecessary background to traffic. Furthermore, they will suggest that sunshine and shadow, the sky and trees are natural elements that will refresh even the most brutalized of city dwellers.

We must say, therefore, that: When principal building frontage cannot be separated from a principal traffic junction, the aim in design should be to segregate pedestrians from vehicles by forming upper-level pedestrian ways or terraces.

21. Two-level Centres. Architects have made proposals for two-level centres: what is now needed is some exhaustive research by other specialists into their practicability. Maybe we should encourage the appropriate ministers by a resolution something like this: The problem of traffic and the city centre requires continuous research which, if instigated by the government, would receive technical assistance from the professions.

22. Fast Urban Traffic Routes. The route of the road will be determined by a study of the regional plan and the town plan. This should ensure that it is properly related to functional zones upon which traffic concentrates; that the least possible disturbance is caused to the internal functioning of the town; that those areas of individuality and character which give the town its personality are not destroyed; and that it is not sited on land of great value for other purposes. In practice the road will pass between building zones, like neighbourhoods, on land which is of least use for other purposes.

23. Threat of the Regional City. A new system of motorways can, if unchecked, open the flood-gates to a torrent of building speculation The town as a cohesive and comprehensive organism could disintegrate and be replaced by the "regional city," a town in which man travels long distances on high-speed roads between places of living, places of work, shopping centres and places of amusement. The regional city is a seductive idea because, on the one hand, it has all the glamour of "big thinking" and, on the other, no one need do very much about it.

24. Decentralization the Complement of Road Design. The motorway, with its complement of urban roads, is a great force for urban expansion: it can accelerate concentration and generate the ills it is designed to cure, or it can be an instrument of decentralization and draw off congestion in the big cities to a more even, natural balance.

Horsbrugh, Patrick

VERTICAL FLIGHT: SOME OBSERVATIONS ON ITS SIGNIFICANCE FOR OUR CITIES

Community Planning Review, Volume IX, Number 4, December 1959. Pages 110-116.
629 139: 711.1 (100)

1. Mr. Horsbrugh, Deputy Director of the Hamilton-Wentworth Planning Board in Canada, has already had a distinguished career in architecture and planning. In London he worked on the research and design of High Paddington and was co-designer of New Barbican.

2. The advantages of vertical lift combined with horizontal speed have been dreamed of for a quarter of a century by aeronautical engineers and planners alike, and the "heliport" has appeared on most master plans, but beyond this "gesture" I have found little evidence of serious study of how vertical flight will affect urban planning. Now, however, when mass transportation by air is becoming a reality and when the helicopter is about to give place to other types of Vertical Take-Off and Landing (V.T.O.L.) Vehicles, the public must grapple with the challenge in immediate and practical terms.

3. The consequence of vertical flight will affect every city within the mechanized civilization almost simultaneously. The advent of mechanical transport has changed ancient cities almost beyond recognition. It has created new cities, and has stimulated urban growth to mammoth proportions. This is an impressive achievement in the space of a little more than a century, but there is more to come--much more. The ramifications of transportation are, it seems, self-perpetuating and, while the giant cities will grow still larger, there is no indication that they will become more tolerable places of habitation. Indeed, everything points to the reverse.

4. The Tangible Future. Automation in industry, power from atomic plants, space heating and limited climatic control, water and atmospheric purification and re-use, are but some of the scientific achievements shortly to be influential upon the urban scene. But none of these, to my mind, will exert the economic effects of Vertical Flight, either to redeem, to shift, or to destroy great tracts of urban and suburban areas. The vehicles now being designed and in experimental production will alter the daily routine of populations to a greater extent than those in the development of the railways and introduction of the automobile. This time, however, the changes will be more rapid because of the greater breadth of associated technology; and the ramifications will be more extensive because of the weakness of the existing urban fabric, and the easily shifted real-estate values.

5. World-wide Conditions Are Advantageous. Several areas in the world seem particularly suited to the special advantages for the early implementation of Vertical Flight. There is first, the Great Lakes Region of the United States and Canada, where the peripheral cities have developed close to each other in distance, but held apart by intervening waters. Similar in geographical situation are the Caribbean Islands, whose economic stability can be

greatly stimulated by the introduction of simplified and cheaper forms of general transportation. In addition, in such developing areas as South East Asia improved communications are fundamental to lasting success of development.

6. The importance of transport facilities of a greatly simplified type in the development of geographically complicated regions such as that of South East Asia is obvious enough. Yet the means of movement are left entirely to specialist engineers, whose influence and authority may, and sometimes does, conflict with sound planning. The planner should become especially conscious of the development of Vertical Flight since it represents a supreme opportunity to get together with both manufacturers and government departments and to interpret to both the potentialities of this new form of movement.

7. V.T.O.L. Aircraft. Other aircraft (as well as helicopters) vary in size from single-person vehicles to multi-passenger liners. At the same time, several aircraft and motor corporations are making progress with vehicles using compressed air as a means of lift and motion (providing ground clearance by several inches) and these too must be included among vertical lift vehicles, for they will also impose changes in the planning and accommodation of surface traffic.

8. It is the arrival of these vehicles within the next decade that makes planning forethought so necessary now. This intense development period must be recognized by the public for exactly what it is: a period of technical exploration in which many of the vehicles now appearing will not survive, but out of which vastly superior vehicles will come for global, regional and urban use. The present time, seems therefore to be the last opportunity we shall have to meet the future media of air transportation, rather than be overtaken and helpless to withstand the effects they produce upon our environment.

9. Airport Location. Until recently the siting of airports was considered primarily a matter for Authorities, military or civil. Now the demand for land within the 60-75 minute radius of any central city, and the acreage necessary for conventional air transports, is so great that planning departments are an inevitable part of the mechanism by which the position of an airport is chosen. And further, with the change in size of aircraft and power units, the effect of an airfield upon any locality can become intolerable in domestic terms.

10. So far, examples of airport planning studies, distinct from planning in architectural terms, seem to be few. The literature on the subject is disappointingly small, though allowance must be made for confidential reports which remain unpublished Probably the most complete bibliography now available is contained in "Airports for Jets" (Major John E. Peterson, U.S.A.F. published by American Society of Planning Officials 1959), a valuable new guide-book giving "Location Requirements for Civil Airfields Serving Heavy Turbo-jet Aircraft." Some 44 publications are listed though only 14 are directly concerned with planning and environment.

11. The late arrival of the planner as an influence upon the location of airfields should not be repeated in respect of vertical flight, especially in face of the obvious need for many city and suburban stages per city. The urban environment cannot sustain yet another distortion by unrestrained transport systems and survive with any of the seemliness we imagine cities should possess, and which some ancient cities retain. The development of previous systems of mass movement were hampered by the need to secure land-surface or waterline, often at very great cost; but now, an acre or so at selected points for V.T.O.L. landing stages may suffice. Covered car-parks may provide the space; the proportional cost of a system of stages will be fractional compared with expenditures on linear routes, and control and maintenance costs may also be comparatively small.

12. The immediate problems of stage locations for vertical flight are by no means clear, as is shown by reports on helicopter landing sites for the London County Council. Hard study, co-ordination, bold experiments and searching analysis are required, based upon the experience which only the planning profession can provide. Both manufacturers and administrators are naturally too preoccupied to foresee the stresses their actions will inflict upon the desperate vulnerable urban fabric. It is unlikely, therefore, that the initiative for establishing planning research in anticipation of such changes will come from those quarters unless it is deliberately proposed by the profession and the public authorities.

13. Instrumentation and Control. This additional dimension of planning--air-space control--is, of course, complementary to horizontal land-use control, but infinitely more difficult to achieve since it is largely intangible, invisible, and depends upon the imagination to an extent beyond anything yet requiring the understanding of the public. This re-assessment of low altitude air space is long overdue in any case, since the problems connected with air-pollution, with the crowding of high structures together, and of the sheet visual enjoyment of the horizon from the confinement of downtown areas, are all elements too long ignored by an urban society.

14. General Conclusions. The ship, the train, the automobile and the flight-through-speed aircraft have all imposed a relatively constricting pattern upon the landscape in their systems of set-surface routes. By contrast, the stage or platform-based vehicle would appear to be highly advantageous to urban convenience. If such is really the case it is time that the remoteness of the aeronautical engineer from the planner was ended, for aircraft designers are about to place at our disposal the most consequential instrument for urban change which this generation is likely to experience (apart, that is, from high explosives).

15. The advent of vertical flight will also enable us to comprehend more effectively that which now exists, in a way hitherto impossible. While flying at conventional heights and speeds, our cities appear impersonal, but the ability to intrude from above at a lower level may be very revealing for the general public. For only while hovering and searching will the tedium and universality of western cities and suburbs become fully apparent. When

roofscapes become the principal means of local identification, then locality will be found to be unrecognizable and as anonymous as the waves, and architecture will be found to have stopped short at eaves and cornic lines. Such discoveries are bound to make the public more critical of their environment. For the first time, the anatomy of the city can become known to the citizen, by being seen almost in totality rather than being felt out by limited horizontal vision. It is generally agreed that cities have outgrown normal human comprehension, and that the inhabitant has lost interest in the whole and even in his own part of the city but, with opportunity to see the horizons, civic self-interest may revive and vertical flight may be the means of its revival.

Ernest Zipkes

A METHOD FOR A FAST EVALUATION OF TRAFFIC CHARACTERISTICS

First Ecafe Study Week in Traffic Engineering and Highway Safety, October 24 - 31, 1959. Bombay, India. Theme IV: Future Trends and Prediction for Planning Urban and Rural Roads.

625.72 : 711.11 (100)

1. Dr. Ernest Zipkes, United Nations Technical Assistance Operations, presented this paper at the first Ecafe Study Week in Traffic Engineering and Highway Safety, October 24-31, 1959.

2. Method of Counting the Traffic from a Moving Car. In areas where development work has yet to be done to implement changes and raise them to better conditions, unfortunately one seldom finds sufficient and reliable traffic statistics. It may prove difficult to put up an organization for detailed traffic counts, the fairly educated and responsible manpower needed may not be available, the costs may be considered too high, and especially in areas of rapid development, life for instance the Middle East, the whole process may take too long for the results to come in time to be useful for the planning of a road project. In such cases, a method ought to be implemented which avoids all these difficulties and produces results which, though they may not be as detailed as those arrived at with one of the methods, nevertheless, give a reliable general picture of the traffic conditions with a minimum amount of effort, cost, and people involved and within a short time.

3. The method developed and applied by the author was to do the counting of vehicles from a moving car. With an arrangement like this. Only two men, one who does the counting and a driver, are needed to travel for a certain time on a selected road network. The engineer to do the processing of the results--according to the method explained below--may be present with advantage. He may do either driving or counting himself. This study was performed in the summer of 1955 in Iran and it amounted to the first systematic traffic count carried out in that country.

4. The results of this traffic count produced data the reliability of which was confirmed later, when a voluminous traffic count based on one of the conventional methods was conducted on one of the roads in question by an English firm who worked on a contract basis as a consultant for the Government. A brief account of this method and of the way of processing the results is described and an example is shown. Certain prescriptions must be observed during the count and some assumptions be made.

5. Group of Vehicles: In principle distinction is made between light and heavy motor vehicles. All motor vehicles up to 3.5 tons total weight according to their transport license were considered as light. The group of heavy vehicles comprises all those with more than 3.5 tons total weight. Trucks, overland buses, petrol tankers, etc., fell into this group and were counted independently.

6. Selected Road Network: Roads chosen according to their importance and particularities form the basic network on which the traffic count is to be carried out.

7. Speed of Vehicles: The relation of the speed of the counting car to the average speeds of the different groups of motor vehicles must be known and taken into account for the processing.

8. Day of Counting: The intensity of the traffic, especially of heavy commercial and touristic vehicles, varies throughout the week according to the day. This is accounted for with a daily factor D.

9. 24-hour Count: In cases where traffic counts are performed for 12 hours, for instance from 07.00 to 19.00--usually on days other than week-end and weekly holiday --the 24 hour total for trucks, etc., may be taken with 1.2 times the 12 hour count. As in this case of counting from a moving car the counting period varied considerably according to the average speed and the distance, and as the counting time lay somewhere between the hours 07.00 and 17.00 the calculations had to be based differently. The decision was made by taking into account the working conditions of the region where the traffic count is carried out. The 24-hour total is assumed with the specific count per hour over the involved period, but taken for 16 hours, i.e., on the average traffic of one counted hour and lasting for 16 hours.

10. Processing of Results: With the method of counting traffic from a moving car the figures counted correspond to a number of vehicles which departed from the end station during a period which is the sum of the average driving time of the counted vehicles or their group, plus or minus the one of the counting car: in cases of motor vehicles met or overtaken. To arrive therefore at a daily total, the result of one count of a certain group of vehicles is multiplied with a general factor:

$$\frac{16}{z_c \pm z_z} \quad \text{or} \quad \frac{16 v_c \; v_z}{S(v_c \pm v_z)}$$

wherein: v equals average speed;

S equals distance; Z equals driving time; and the respective indices are: z for counting car and c for the counted vehicles or groups.

11. Further, the daily traffic loads of a particular road will approximately be found when the daily totals of vehicles as arrived at according to the above factors are multiplied with an assumed average weight of the vehicles or the particular group of vehicles. The traffic volume and traffic weight may be calculated for each direction and for each group of vehicles and may be considered as a total or in proportions.

12. Conclusion. Before such a traffic count is carried out the following conditions ought to be satisfied, thus to arrive at results complying best with reality. They are:

a. The average weights and driving speeds have to be controlled and to be assumed according to local habits and conditions. They can change with road improvements and with the introduction of improved types of vehicles.

b. When long distances are considered in most of the cases the local traffic near villages and cities may be omitted, therefore, this local traffic has to be defined in advance.

c. The counting ought to be performed on days and at times typical for the kind of traffic and vehicles desired. The beginning of the count should be timed in a way that the general time of departure of the vehicles to be counted is included.

d. The counting vehicle ought to maintain a reasonable fluent speed according to the local habits and conditions of the road.

13. The conditions under which errors will be small and therefore the results reliable are:

a. If the count is effected over long distances;

b. If along these roads few or no junctions exist;

c. If the frequencies of the traffic are within the limits of the recording means.

14. As these conditions are often found in industrially developing countries, where traffic statistics do not exist and where conventional traffic counting methods can not be carried out, the traffic count from a moving car seems especially indicated. This method is also useful in evaluating existing statistics.

15. The method allows an estimation of traffic characteristics by sampling only a relatively small portion of the total traffic flow. Considering the very limited manpower, little time needed, and low costs to arrive at results, compared to their relatively high accurateness, it appears that where similar conditions prevail, this counting methods could be recommended.

16. Application of the Method as Performed in 1955 in Iran. As light trucks with a total weight below 3.5 tons hardly existed on Iranian Highways, the average weight of a light motor vehicle was assumed to be 1.5 tons. The empty weight of heavy motor vehicles may vary from 4 to 15 tons, their utilisable capacity another 10 to 25 tons. In 1955 the maximum weight for heavy commercial motor vehicles was fixed as 45 tons and the average weight of a heavy vehicle was assumed to be 25 tons. This average was meant to take into account the usual heavy overload, above the transport license of a vehicle.

17. The traffic on the highways, each longer than 100 km. with very very controllable junctions was counted at typical hours. Two of them were driven in both directions on different weekdays and hours. The roads selected are given with the day and time at the counting in Table A.

TABLE A

No.	Date	Road From	To	Time	Distance
1.	21-5-55	Takestan	Hamadan	09.00 - 12.00	201 km
2.	21-5-55	Hamadan	Kermandshah	13.00 - 16.30	190 km
3.	24-5-55	Ghom	Rey	14.30 - 16.30	141 km
4.	8-6-55	Tehran	Ghazvine	08.15 - 10.05	131 km
5.	8-6-55	Ghazvine	Tehran	10.05 - 12.00	131 km
6.	22-6-55	Rey	Ghom	08.45 - 10.50	141 km
7.	22-6-55	Ghom	Rey	11.05 - 13.30	141 km
8.	29-6-55	Karadj	Ghazvine	07.28 - 08.59	105 km
9.	29-6-55	Ghavzine	Resht	09.07 - 12.25	194 km
10.	2-7-55	Chalous	Karadj	09.40 - 13.40	157 km
		Total Distance			1,432 km

18. On open straight raods the normal cruising speed of the counting car was about 80 to 100 km/hour whereas that of trucks and buses, when followed were found to cruise at about 55 to 75 km/hour. It was further found that over long distances the average speed of the counting car was about 2/3 of the normal cruising speed. This proportion applied also to the heavy motor vehicles. As it was further observed that drivers of trucks and sometimes also of buses had a habit of tea-stops, etc., their actual average speed is further reduced. These considerations led to the assumption of an average

speed for heavy motor vehicles of about 50 percent of the average speed of the counting vehicle. The actual average speed naturally varied with each road.

19. The speed of light vehicles was assumed to be the same as the counting car's and therefore no light vehicles were noted as being overtaken. It was assumed that the light vehicles travelling in the same direction were roughly the same number as those met.

20. The daily factor D is given in Table C. Note: Friday is the weekly holiday in Iran.

TABLE C

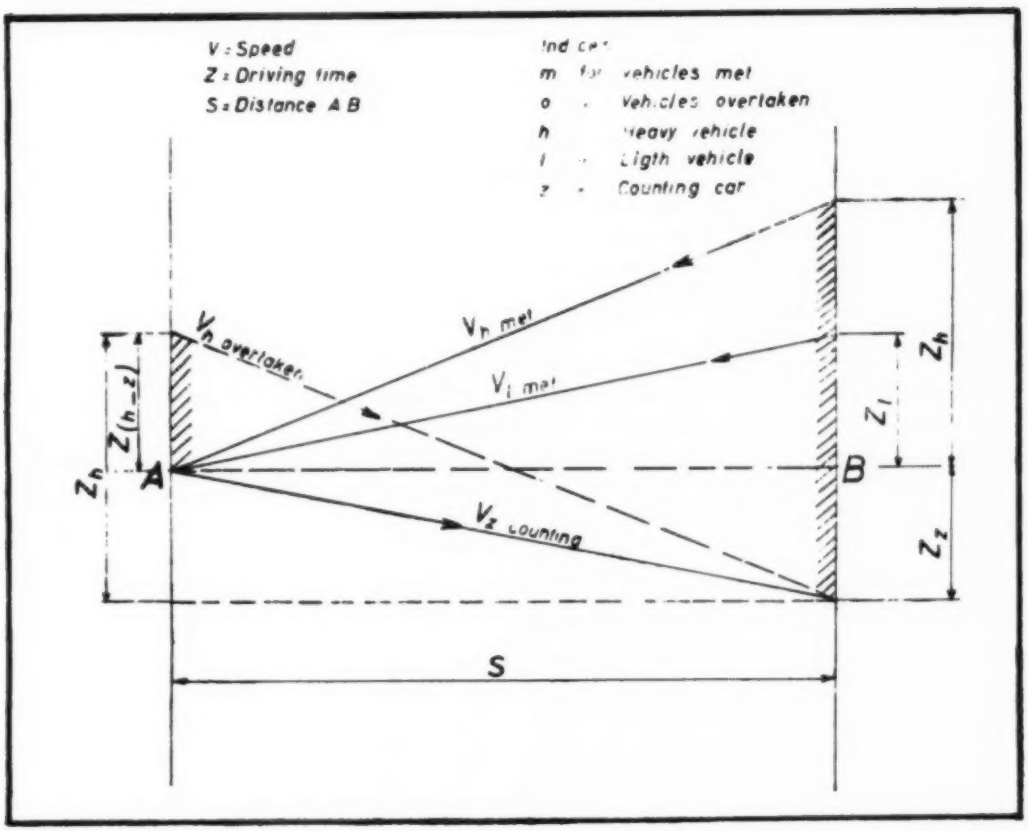
Day of Week	Factor D	To Be Used in Iran On
Monday	1.03	Saturday*
Tuesday	1.04	Sunday
Wednesday	0.89	Monday
Thursday	0.99	Tuesday*
Friday	1.04	Wednesday*
Saturday	0.51	Thursday
Sunday	0.35	Friday
Average	0.836	

*Days on which counts were carried out.

21. The counting was carried out on Saturdays, Tuesdays and Wednesdays. Although the average factor D over the three weekly days is 1.02, D was taken with 1.0 for the census days in order to equivalent the time of counting which varied between 08.15 and 17.30, being scattered over the day-time without trying to get the time of maximum frequency.

22. The results and processing of the traffic counts may be seen in the charts on pages 35, 36 and 37. The deductions from this indicated some of the following. The traffic on the roads observed was of relatively low intensity and except in and near cities and villages practically no animal tractioned traffic and no bicycles were met.

23. Three to fourteen heavy vehicles were met per counting minute for one light vehicle, dpending on the particular nature of the road and the counting time.


V = Speed
Z = Driving time
S = Distance A B
Ind ce
m for vehicles met
o . Vehicles overtaken
h Heavy vehicle
l . Ligth vehicle
z . Counting car
V h overtaken
V h met
V l met
V z counting
Z (h-z)
Z h
Z h
Z l
Z z
A
B
S

24. The average for the ten roads came to about 6.23 heavy vehicles against one light per counting minute.

25. The number of heavy vehicles per day is many times that of light vehicles. According to the particular nature of the road and the counting time it varied between 2.3 and 9.5. The average proportion for the roads came to 4.5 to 1.

26. The daily load brought on the road by heavy vehicles lay between 30 and 160 times that brought on by light vehicles, depending on the particular nature of the road and the counting time. The average for the roads came to about 75 to 1.

27. For the highway with the heaviest traffic among those counted, some of these being probably the most heavily trafficed highways in Iran, the results showed--as can be seen from the tables--a traffic load of about 20,000 tons per day with a maximal frequency of 1,000 vehicles per day, out of which 750 are heavy and 250 light ones. The total traffic figures of the other roads are smaller and vary according to their importance.

28. As a general deduction it may be stated that at the time of counting, the traffic on the roads had a relatively low frequency but was predominantly heavy vehicles, whereas the light vehicles were obviously concentrated in the cities.

29. The figures arrived at have, as explained, a general character. They give neither an absolute maximum or minimum for a certain road. They have to be considered in the light of the method of counting applied and the circumstances under which the counting took place; they depend on the time and the day of counting, and the season and certain general conditions prevailing at that time. In spite of such restrictions, however, they give a true and useful picture of the characteristic of the traffic and if the assumptions are chosen reasonably, the errors they may contain will be of very little significance.

30. The aim of the study was to arrive at a conclusion about the characteristic of the traffic on roads in Iran. It did not appear very important to arrive also at exact data about absolute or average traffic volumes. The processed result based on certain assumptions gave a fairly correct indication about the frequency and groups of vehicles and a sufficiently correct estimate of the total traffic load, without claiming absolute exactitude.

TABLE D RESULTS OF THE COUNTING

No.	Road	Buses		Trucks		Petrol-Tankers		Light Cars	Met		Overtaken
		Met	Overtaken	Met	Overtaken	Met	Overtaken	Met	Heavy Rmh	Light Rml	Heavy Roh
I	Takestan-Hamadan	11	1	46	5	17	6	10	74	10	12
II	Hamadan Kermanshahr	9	4	44	16	30	5	15	83	15	25
III	Ghom--Rey ...	24	5	35	18	13	11	14	72	14	34
IV	Tehran--Ghazvine ...	23	13	85	32	13	4	17	121	17	49
V	Ghazvine-Tehran ...	22	5	75	46	14	5	31	111	31	56
VI	Rey--Ghom ...	35	11	55	11	24	2	8	114	8	24
VII	Ghom--Rey ...	31	6	40	22	11	17	16	82	16	45
VIII	Karadj--Ghazvine ...	18	6	32	13	8	4	12	58	12	23
IX	Ghazvine--Resht	7	7	45	28	7	4	9	59	9	39
X	Challous—Karadj	2	7	65	36	14	0	37	102	37	43

Note :—Buses, trucks and petrol-tankers are considered as heavy vehicles.

TABLE E. PROCESSING OF THE DAILY TRAFFIC LOAD

Road ...	I	II	III	IV	V	VI	VII	VIII	IX	X*
Day ...	Saturday		Tuesday			Wednesday				Saturday
Date 1955	21.5	21.5	24.5	8.6	8.6	22.6	22.6	29.6	29.6	2.7
Time From	0900	1300	1430	0815	1005	0845	1105	0728	0907	0940
Time to	1200	1630	1630	1005	1200	1050	1330	0859	1225	1340
Duration in Minutes	180	210	120	110	115	125	145*	91	198	240
Distance in km. ...	201	190	141	131	131	141	141	105	194	157
Speed and Driving Times :										
Speed $v_z = v_1$ km/h	6726	54.3	70.5	71.4	68.4	67.7	58.3	69.2	58.2	39.2
Speed v_h. km/h. ...	33.5	27.15	35.25	35.7	34.2	33.9	33.9	34.6	39.1	19.60
Driving time $z_z = z_1$ h.	3	3.5	2	1.83	1.92	2.08†	2.42/2.08	1.52	3.32	4.0
Driving time z_h hours	6	7	4	3.66	3.84	4.16	4.16	3.04	6.64	8.0
Factors :										
f_l met = $\frac{16}{z_l + z_z}$ = fl overtaken	2.67	2.28	4.0	4.41	4.17	3.85	3.56	5.25	2.42	2.0
f_h met = $\frac{16}{z_h + z_z}$ =	1.78	1.52	2.67	2.92	2.78	2.56	2.43	3.51	1.61	1.33
f_h overtaken = $\frac{16}{z_h - z_z}$ =	5.34	4.57	8.0	8.75	8.34	7.69	9.2	10.53	4.82	4.00
Results of Counting :										
R_h met ...	74	83	72	121	111	114	82	58	59	102
R_l met = R1 overtaken	10	15	14	17	31	8	16	12	9	37
R_h overtaken ...	12	25	34	49	56	24	45	23	39	43
Daily Total in One Direction for Heavy and Light Vehicles :										
$R_{mh} \times f_{hm} \times 25 = L_{hm}$	3310	3130	4820	8820	7710	7280	4980	5080	2380	3390
$R_{lm} \times f_{lm} \times 5 = L_{lm}$	40.1	51.2	83.9	112.5	194.1	46.2	85.4	99.4	32.7	111.0
$R_{ho} \times f_{ho} \times 25 = L_{ho}$	1601	2855	6790	10710	11670	4620	10350	6070	4700	4300
$L_{lo} = L_{lm}$	40.1	51.2	83.9	112.5	194.1	46.2	85.4	99.4	32.7	111.0
Daily Total in Both Directions :										
$L_{hm} + L_{lm} + L_{ho} + L_{lo} = T$	4991.2	6087.4	11787.8	19755.0	19768.2	11992.4	15500.8	11348.8	7145.4	7912.0

*Saturday of road X was local holiday ; † Longer driving time due to taking photos.

TABLE G. PROPORTION OF HEAVY TO LIGHT VEHICLES IN NUMBERS PER DAY AND TONS PER DAY

	Ton/Day		Vehicles/Day		FACTOR Heavy/Light	
Road	Heavy veh. a	Light cars b	Heavy vehicle a 2.5 c	Light cars b/1.5 d	Tons/Day a/b	Number/Day c/d
I	3310	40.1	132.4	26.7	82.6	4.96
II	3130	51.2	125.2	34.2	61.2	3.67
III	4820	83.9	192.8	55.9	57.4	3.45
IV	8820	112.5	352.8	75.1	78.3	4.70
V	7710	194.1	308.4	129.5	39.7	2.38
VI	7280	46.2	291.2	30.8	157.5	9.45
VII	4980	85.4	199.2	56.9	58.4	3.50
VIII	5080	99.4	203.2	66.2	51.1	3.07
IX	2380	32.7	95.2	21.8	72.9	4.37
X	3390	111.0	135.6	74.0	30.5	1.83
Vehicles Met				Average ...	68.96	4.14
I	1601	40.1	64.04	26.7	40.0	2.40
II	2855	51.2	114.2	34.2	55.8	3.34
III	6790	83.9	271.6	55.9	81.0	4.85
IV	10710	112.5	428.4	75.1	95.4	5.70
V	11670	194.1	466.8	129.5	60.2	3.61
VI	4620	46.2	184.8	30.8	100.0	6.00
VII	10350	85.4	414.0	56.9	121.2	7.27
VIII	6070	99.4	242.8	66.2	61.0	3.67
IX	4700	32.7	188.0	21.8	147.5	8.63
X	4300	111.0	172.0	74.0	38.8	2.32
Vehicles Overtaken				Average .	80.1	4.78
I	4911	80.2	196.44	53.4	61.3	3.68
II	5985	102.4	239.40	68.4	58.5	3.51
III	11610	167.8	464.40	111.8	69.2	4.15
IV	19530	225.0	781.20	150.2	86.9	5.20
V	19380	388.2	775.20	259.0	50.0	3.00
VI	11900	92.4	476.00	61.6	128.8	7.73
VII	15330	170.8	613.20	113.8	89.8	5.39
VIII	11150	198.8	446.00	132.4	56.1	3.37
IX	7080	65.4	283.20	43.6	110.2	6.50
X	7690	222.0	307.60	148.0	34.7	2.08
Vehicles Total				Average ...	74.55	4.46

TABLE E. PROCESSING OF THE DAILY TRAFFIC LOAD

Road ...	I	II	III	IV	V	VI	VII	VIII	IX	X*
Day ...	Saturday		Tuesday			Wednesday				Saturday
Date 1955	21.5	21.5	24.5	8.6	8.6	22.6	22.6	29.6	29.6	2.7
Time From	0900	1300	1430	0815	1005	0845	1105	0728	0907	0940
Time to	1200	1630	1630	1005	1200	1050	1330	0859	1225	1340
Duration in Minutes	180	210	120	110	115	125	145*	91	198	240
Distance in km. ...	201	190	141	131	131	141	141	105	194	157
Speed and Driving Times :										
Speed $v_z = v_1$ km/h	6726	54.3	70.5	71.4	68.4	67.7	58.3	69.2	58.2	39.2
Speed v_h. km/h. ...	33.5	27.15	35.25	35.7	34.2	33.9	33.9	34.6	39.1	19.60
Driving time $z_z = z_1$ h.	3	3.5	2	1.83	1.92	2.08†	2.42/2.08	1.52	3.32	4.0
Driving time z_h hours	6	7	4	3.66	3.84	4.16	4.16	3.04	6.64	8.0
Factors :										
f_1 met $= \frac{16}{z_1 + z_z}$ = fl over-taken	2.67	2.28	4.0	4.41	4.17	3.85	3.56	5.25	2.42	2.0
f_h met $= \frac{16}{z_h + z_z}$ =	1.78	1.52	2.67	2.92	2.78	2.56	2.43	3.51	1.61	1.33
f_h over-taken $= \frac{16}{z_h - z_z}$ =	5.34	4.57	8.0	8.75	8.34	7.69	9.2	10.53	4.82	4.00
Results of Counting :										
R_h met ...	74	83	72	121	111	114	82	58	59	102
R_1 met = R1 overtaken	10	15	14	17	31	8	16	12	9	37
R_h overtaken ...	12	25	34	49	56	24	45	23	39	43
Daily Total in One Direction for Heavy and Light Vehicles :										
$R_{mh} \times f_{hm} \times 25 = L_{hm}$	3310	3130	4820	8820	7710	7280	4980	5080	2380	3390
$R_{1m} \times f_{lm} \times 5 = L_{lm}$	40.1	51.2	83.9	112.5	194.1	46.2	85.4	99.4	32.7	111.0
$R_{ho} \times f_{ho} \times 25 = L_{ho}$	1601	2855	6790	10710	11670	4620	10350	6070	4700	4300
$L_{lo} = L_{lm}$	40.1	51.2	83.9	112.5	194.1	46.2	85.4	99.4	32.7	111.0
Daily Total in Both Directions :										
$L_{hm} + L_{lm} + L_{ho} + L_{lo} = T$	4991.2	6087.4	11787.8	19755.0	19768.2	11992.4	15500.8	11348.8	7145.4	7912.0

*Saturday of road X was local holiday ; † Longer driving time due to taking photos.

TABLE G. PROPORTION OF HEAVY TO LIGHT VEHICLES IN NUMBERS PER DAY AND TONS PER DAY

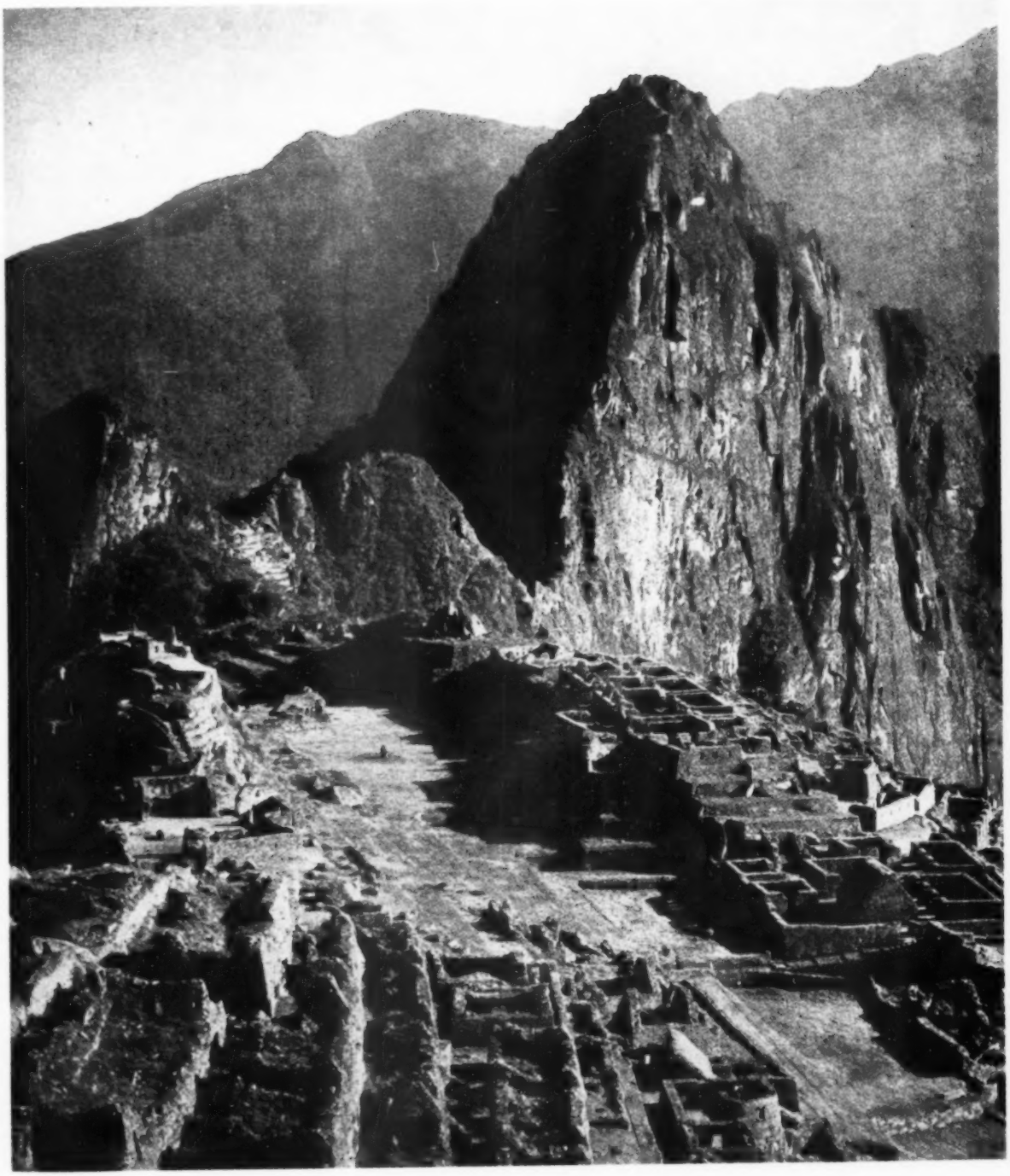
	Ton/Day		Vehicles/Day		FACTOR Heavy/Light	
Road	Heavy veh. a	Light cars b	Heavy vehicle a 25 c	Light cars b/1.5 d	Tons/Day a/b	Number/Day c/d
I	3310	40 1	132 4	26 7	82 6	4 96
II	3130	51 2	125 2	34 2	61 2	3.67
III	4820	83 9	192.8	55 9	57 4	3.45
IV	8820	112 5	352 8	75 1	78 3	4 70
V	7710	194 1	308 4	129 5	39 7	2 38
VI	7280	46 2	291.2	30.8	157.5	9 45
VII	4980	85 4	199 2	56 9	58 4	3 50
VIII	5080	99 4	203 2	66.2	51 1	3.07
IX	2380	32 7	95 2	21.8	72 9	4.37
X	3390	111 0	135 6	74 0	30 5	1 83
Vehicles Met				Average ...	68.96	4 14
I	1601	40 1	64 04	26 7	40 0	2.40
II	2855	51 2	114 2	34 2	55 8	3 34
III	6790	83 9	271 6	55.9	81 0	4 85
IV	10710	112 5	428 4	75.1	95.4	5.70
V	11670	194 1	466 8	129.5	60 2	3.61
VI	4620	46 2	184 8	30 8	100 0	6 00
VII	10350	85 4	414.0	56.9	121 2	7.27
VIII	6070	99.4	242.8	66.2	61.0	3.67
IX	4700	32.7	188 0	21.8	147.5	8.63
X	4300	111.0	172 0	74 0	38 8	2 32
Vehicles Overtaken				Average .	80.1	4.78
I	4911	80.2	196.44	53.4	61.3	3.68
II	5985	102.4	239.40	68.4	58.5	3.51
III	11610	167.8	464.40	111.8	69.2	4.15
IV	19530	225.0	781.20	150 2	86.9	5.20
V	19380	388.2	775 20	259.0	50.0	3.00
VI	11900	92.4	476.00	61.6	128.8	7.73
VII	15330	170.8	613.20	113.8	89.8	5.39
VIII	11150	198.8	446.00	132.4	56.1	3.37
IX	7080	65.4	283.20	43.6	110.2	6.50
X	7690	222.0	307.60	148.0	34.7	2.08
Vehicles Total				Average ...	74.55	4.46

Moholy-Nagy, Sibyl
SOME ASPECTS OF SOUTH AMERICAN PLANNING
Progressive Architecture, February, 1960. Pages 136-142. Illustrations.
711.12 (8)

1. The problem of handling a formidable landscape is dominant in the character of planning as pointed out in this abstraction from an article by Sibyl Moholy-Nagy, Associate Professor of Architecture, Pratt Institute, Brooklyn, New York.

2. Even the most favorably inclined critic must confess to an initial irritation at a seemingly illogical approach to planning problems in South America. It does not make sense to find Mexico City without legislation against skyscrapers whose foundations show like underwear because the ground on which they are built is sinking into the bottomless morass of a lake bed. Why academic showplaces of staggering dimensions and cost, in poverty-stricken countries that have no mandatory primary or secondary education? The magnificent seashore of Venezuela is shattered and violated by hotels and apartment blocks of indifferent vulgarity, as if the Caribbean had no more to offer than Rockaway Beach. Cartagena's Boca Grande and Lima's San Isidro, on the other hand, are nightmares of gimmick speculator houses straight from some film-comedy set. After a month or so of continuous visual intake and personal contacts, motivations become apparent which explain some of the contradictions. South American planners and architects are divided into two major groups. There are those who accept and love the paradoxes of their country, who are trying to balance man and nature on the fulcrum of their design. They are, to use an old cliché, the regionalists. The others are the universalists, who define architecture as man made environment, deliberately planned on intellectual and technological resources only.

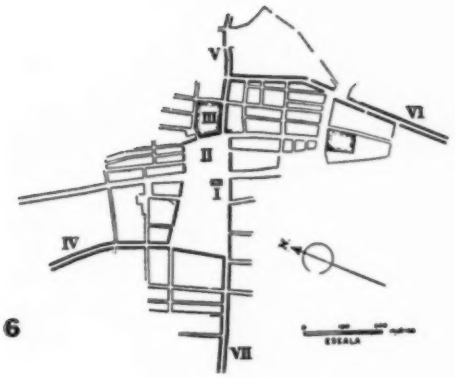
3. The choice between environmental submission or environmental protest has been forced on South American builders since their earliest civilizations. It has been a choice of means for survival, historically evident in the contrasting concepts of Inca and Maya planning. The Inca Empire of the late Middle Ages, which was heir and pinnacle to successive Andean cultures, proceeded from total site integration and a maximum utilization of given features. The sacred city of Machu Picchu (illustration, page 39) in the most inaccessible part of the High Andes has a plan that prescribes for man-in-motion a diagonal path implied by successive terraces. Instead of a monumental axis defined by symmetrical masses leading inevitably toward the architectural climax of a pylon or a cathedral entrance, there is a kaleidoscopic experience of the overwhelming mountain setting. The drama of natural environment is enhanced by the stark simplicity of the buildings, which do not block the view but frame it in a succession of carefully planned "miradores." Every Inca settlement had these connecting points between man and nature. Vista after vista unfolds until the High Place is reached out of devotional volition, and man confronts "the place where the sun is tied" above the planned architectural experience.



4. The Mayan peoples established their empire in the steaming jungles of Guatemala and Yucatan. Their only chance of survival was environmental rejection, the disdain of high intelligence and artistic genius for the uncontrollable chaos surrounding them. They are the first urbanists of the Americas--Uxmal, the urbs of Majan Classicism, is the proof of their universalism. All important buildings at Uxmal face inward toward clearly defined courts and inter-related spaces. They are set off from the site by high platforms. Although the progression of movement is not axial, the gentle curve of access never loses sight of the ultimate goal--the Great Pyramids, closing this man-made universe of sacred and profane buildings with finality. The placement of the Palace of the Governor, laterally and obliquely relates to the main plaza, adds splendid secular authority to the Forum Mayum without intruding on the religious climax.

5. The subliminal planning philosophy of the Inca and the humanistic one of the Maya was mercilessly destroyed. The conquerors acquired, with the land and the gold, environmental challenges for which they were not prepared. The self-destructive blindness that exterminated the very culture that had come to terms with this deadly environment remains forever revolting; but one must admit a grudging admiration for the tenaciousness with which the Spaniards learned their error. The flourishing cities of South America are today those established by the Conquistadoes. Their success depended on the choice between utilization of intrinsic conditions or their exclusion. The plan of Cuzco (page 41) was laid out by the rulers to serve their three state principles: public welfare, planned development and distribution of resources, and constant communication between authorities. Only so could a state survive in the most inhospitable region of this continent. The Cuzco plan emphasizes centralized space for assembly and distribution of goods. The main roads of access "feed" the plaza from well separated angles. The residential section of the town core (II in the plan) is clearly set off by a narrowing of the open space toward the highest rise of the ground. The Spaniards retained the essential features of the Inca plan. Official and residential areas are still clearly emphasized with the additional feature of continuous arcading unifying house elevations of strongly individualistic design.

6. When the cargo from Europe changed from royal decrees, soldiers, and priests to speculators, engineers, and the collected writings of Le Corbusier, the old environmental dichotomy ceased to be purely empirical. South Americans are still and always will be faced with topographical, climatic, and ethnological problems that are too violent for environmental indifference; but the solutions show an increasing influence of European prototypes and theories. The phenomenal expansion of Sao Paulo--"The Chicago of South America"--produced a skycraper crop combining modular assembly with a highly emotional individualism. (Illustration, page 41). On lots so narrow and irregular that no intelligible street pattern can develop, grows a wild forest of concrete towers. Many have never been finished because their financing failed. The torrential rains reduce them quickly to ruins, but new projects are started on the narrow gaps between them as if this were a contest in self-assertion.



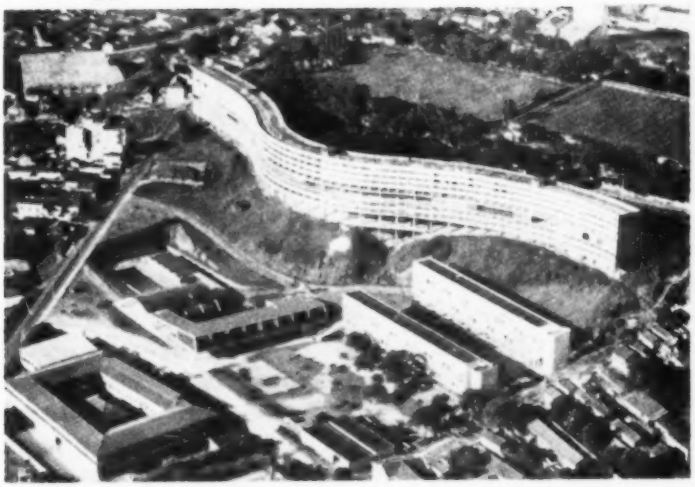
6

7

9

13

Carlos Botelho



Compañía Shell de Venezuela

14

15

decrees; geographical phenomena develop slowly, and once developed have a tendency to persist." If his analysis is true, Brazilians will be left with the burden of supporting a giant administration compound in addition to raising the multibillion cruzero costs to build it. Costa's plan provides along the monumental center axis an elaborate system of sunken and raised traffic lanes for heavy concentration of vehicles. "The car . . . has been domesticated and is almost a member of the family." Yet the mass housing for thousands of government employees provides no garages, and a single bridge will link the north and south residential islands with the main city. It is obvious that either the multi-leveled traffic patter is superfluous or the Rio nightmare of parked and moving cars choking the streets will be repeated.

10. When the President of Brazil endorsed this deadly cliché he turned his back on the long history of man's desire for an intelligible relationship with his environment, natural or manmade. This environmental ideal is indivisible and must benefit all parts of the town, or it is nothing. Neither the cold comfort of defined government symbols nor the beauty of an inaccessible natural paradise will resign the prisoners of old and new minimum dwellings to their homelessness. From this aspect, the modern planners of South America has not yet succeeded in striking a balance between man and his environment.

Clay, Grady
FIGHTING THE RISE: CONSIDER THE HILLSIDES AND THEIR NEEDS
Landscape Architecture, Winter 1959-1960. Page 75.
711.65 (100)

1. In the winter issue of Landscape Architecture, "Fighting the Rise" was a theme presented through a series of articles with a foreword by the associate editor. We have abstracted from this editorial foreword and followed it by two of the eight articles: the first presents the problem of planning with regard to steep landscape, taking the specific example of Pittsburgh; the other, the problem of new housing developments erected on hillsides, which often destroy the natural character of the landscape.

2. Gravity is one of man's great enemies; it has shaped man himself, conditioned his thoughts as well as physique, and has put its unmistakable stamp upon his house, his garden, and his city. In those European cities shaped before the automobile fell upon them, the first streets were fitted into the slopes, carefully adapted to the pulling power of the human leg, of oxen and the horse. This worked well--until the sheer size of cities and the pressure for building sites forced man up the slopes. But all too often his better instincts as well as his budget was exhausted by the struggle. Instead of creating on the hillside a place of beauty, he tended to build cheaply, to cut corners, to dump freely. In short, he showed his worst side as he uglified the hillsides, polluted them with garbage, killed off the vegetation with slag and broken bottles, adding visual pollution for good measure, as if to show off his far-reaching power.

3. Whatever you do to your hillsides establishes the visual character of your community. You slice the hills open, and the scars show for miles and miles. You turn them into dumps, and the visual stench reaches into the next county. Let them erode, and silt and mud pollute the waters of towns in the next state downstream. Hillside damage is community damage, a slipping slope may undermine a whole neighborhood. And visual pollution encourages everyone within sight--which might include a million or so people--to go and do likewise.

4. Occasionally the visitor to the Pittsburghs of the world is assured that such devastation is the price of "progress" and that we must exploit the landscape down to its bitter ruin in order to make enough money to reclaim it later. Some university research is now being conducted into the way we look at our environment, and into the basis of a sense of beauty. I submit that steep landscapes are dominant influences; they cry out for the hand of the skilled designer as well as for the help of the conservationist. Overshadowing many more accepted architectural landmarks, they desire top ranking among things to be protected in our future landscape.

Swain, William Grant
MAKING UP FOR 200-YEAR LOSS IN PITTSBURGH
Landscape Architecture, Winter 1959-1960. Pages 76-80. Illustrations.
711.01 (73)

1. William Grant Swain, a practicing landscape architect in Pittsburgh, shows sensitivity to the problems posed by the rugged terrain of his city and, at the same time, the potentials of this for an intriguing urban landscape. He points to errors which have been made in other cities with similar landscape problems and offers some ways to make the most of steep grades within cities.

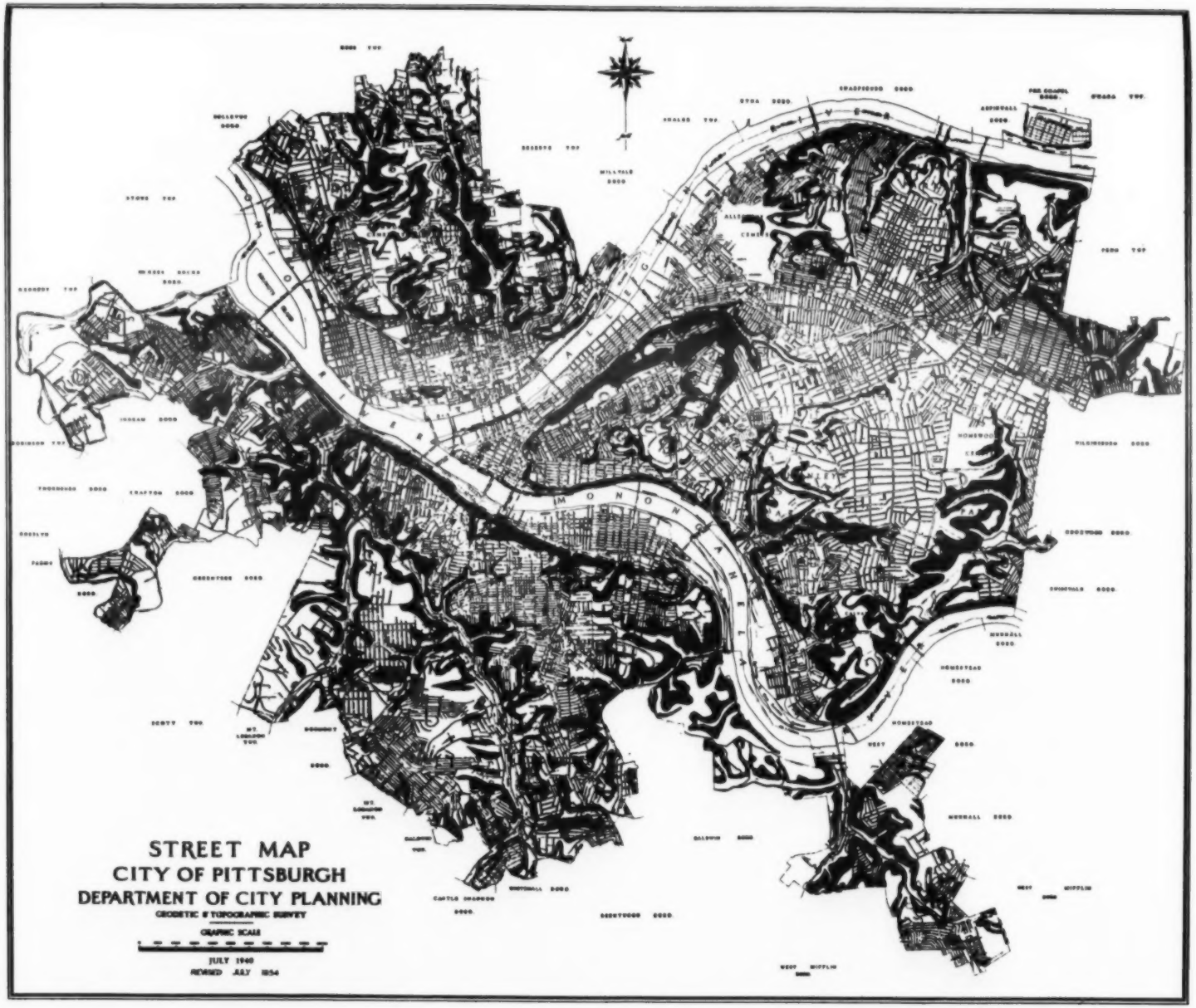
2. Time and man have been unkind to the steep hillsides of Pittsburgh. Instead of aging gracefully, the city shows the deep wrinkles and scars of a two-century "binge," a masquerade whose theme has been "Progress." Those many years have brought us to a sprawling metropolitan area of 35,460,700 acres that had its beginning as a small settlement at the edge of a narrow flood plain. In the next 150 years, man exploited the rivers and the landscape, until in 1910 the Civic Commission hired Frederick Law Olmsted to make a study of the main thoroughfares and the downtown district.

3. Olmsted's Vision of 1910. The investigations led to many related solutions for problems arising out of the topography. The Olmsted report stated.

> Generally speaking, the slopes are of little value for business purposes and are not well adapted to residential use, the cost of development being excessive in proportion to the location value of the improved property..... These steeper and more irregular pieces will be of greater use to the public than they could be to private occupants.

In the half-century since 1910, despite Olmsted's recommendations, the momentum of the first one hundred and fifty years has been difficult to overcome. Today, conservation is the key to Pittsburgh's renaissance.

4. Needed. Public Control of Steep Slopes. There still exists a strong need for public acquisition of slopes which now support grossly inadequate housing. When such properties become tax delinquent, they should be taken by the City and adapted to public use. While the restoration of their natural forests is the best "use" we can propose, in some locations the steep landscape can be used for multiple housing units, wherein the individual plots would be large enough to accommodate the necessary grading. Codes should require that any such development include planning, designed to stabilize as well as beautify. Contiguous, low-gradient boulevards, serving the housing units and proceeding to hilltop communities, would then pass through park-like surroundings with magnificent, sweeping vistas of the city.

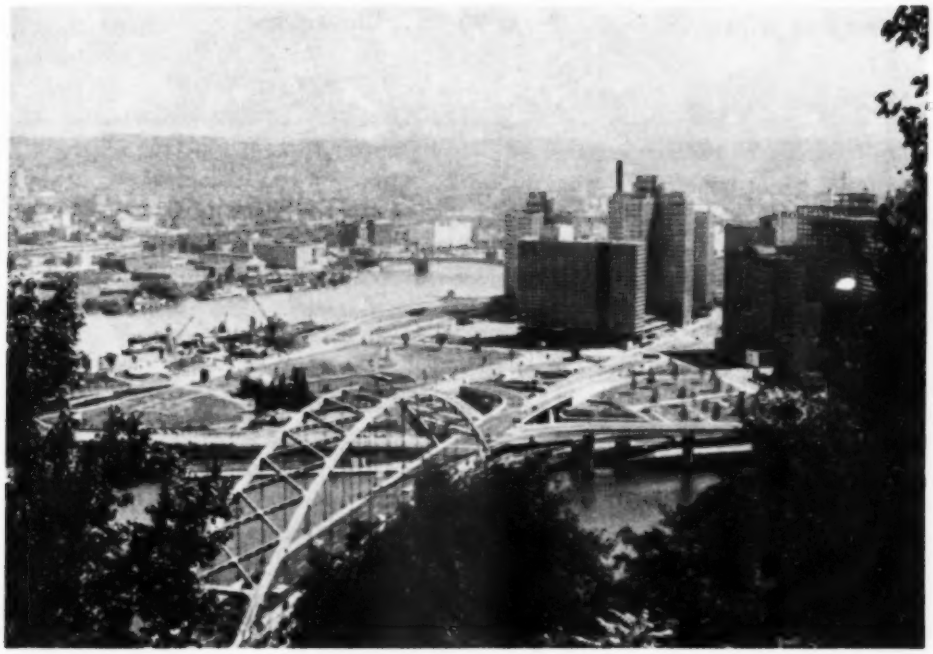

STREET MAP
CITY OF PITTSBURGH
DEPARTMENT OF CITY PLANNING
GEODETIC & TOPOGRAPHIC SURVEY
GRAPHIC SCALE
JULY 1940
REVISED JULY 1954

5. Perhaps the greatest unrealized potential inherent in the hills is their unique relation to the downtown area. In all except a relatively few isolated spots, the view is blocked by buildings on the crest. The public is denied enjoyment of a spectacular urban landscape. Upon the same basis as for the slopes, we propose the ultimate removal of private buildings and the prohibition of new construction except that of essentially public character, such as restaurants. The City Council has already required two such sites.

6. Neighborhood "Overlook" Plan. The City has also asked for specific selection of property, to serve as neighborhood overlooks. There are many secondary, yet equally exciting, views in directions other than toward the Golden Triangle at the center of the city. Generally, these overlooks will be only one lot wide, accommodating one or two automobiles, designed for the enjoyment of people living within walking distance and not ncessarily for the community as a whole. In a number of locations they occur at the top of the monumental stairs that dot the city--tiny resting places suspended over the slopes.

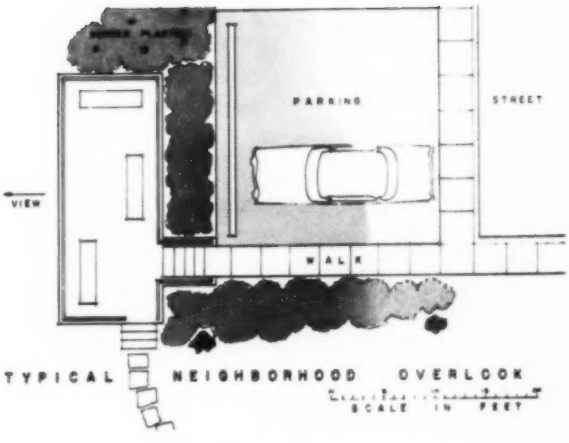
7. A "Scenic Belt." Connecting these panoramic drives and overlooks, a "Scenic Belt" is proposed. Pittsburgh is circled by belt routes, at intervals averaging two or three miles apart, which permit traffic to by-pass the central congestion. The scenic belt does not depend on these traffic arteries to take people from one scenic point to another. This is, truly, a recreational benefit that our unique topography affords. For the most part, it requires only minimum improvement of existing rights of way, a few short additions, and the erection of sign posts.

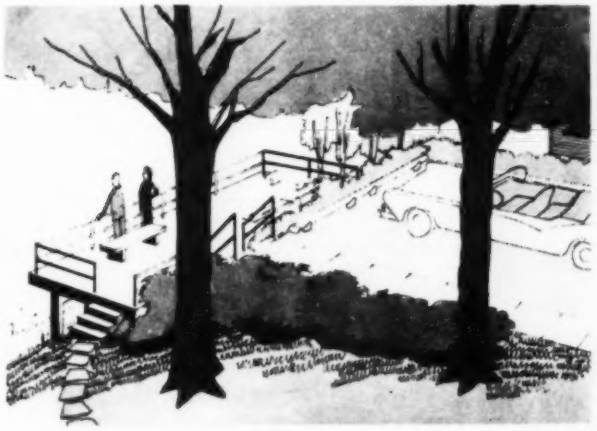
8. The Cost. No estimate has been made of the cost of the over-all program. But, it is significant that a large number of hillside ideas are concerned with the simple conversation of liabilities to assets, not calling for great expenditures, nor requiring reduction of revenues.



No American city claims a more spectacular view than the one from Grandview Avenue.

Plan and perspective of suggested neighborhood overlook platform





Jaffe, Ruth
FOLLOWING THE TRAIL OF THE "CAT"
Landscape Architecture, Winter 1959-60. Pages 90-93. Illustrations.
711.65 ; 624.132 (73)

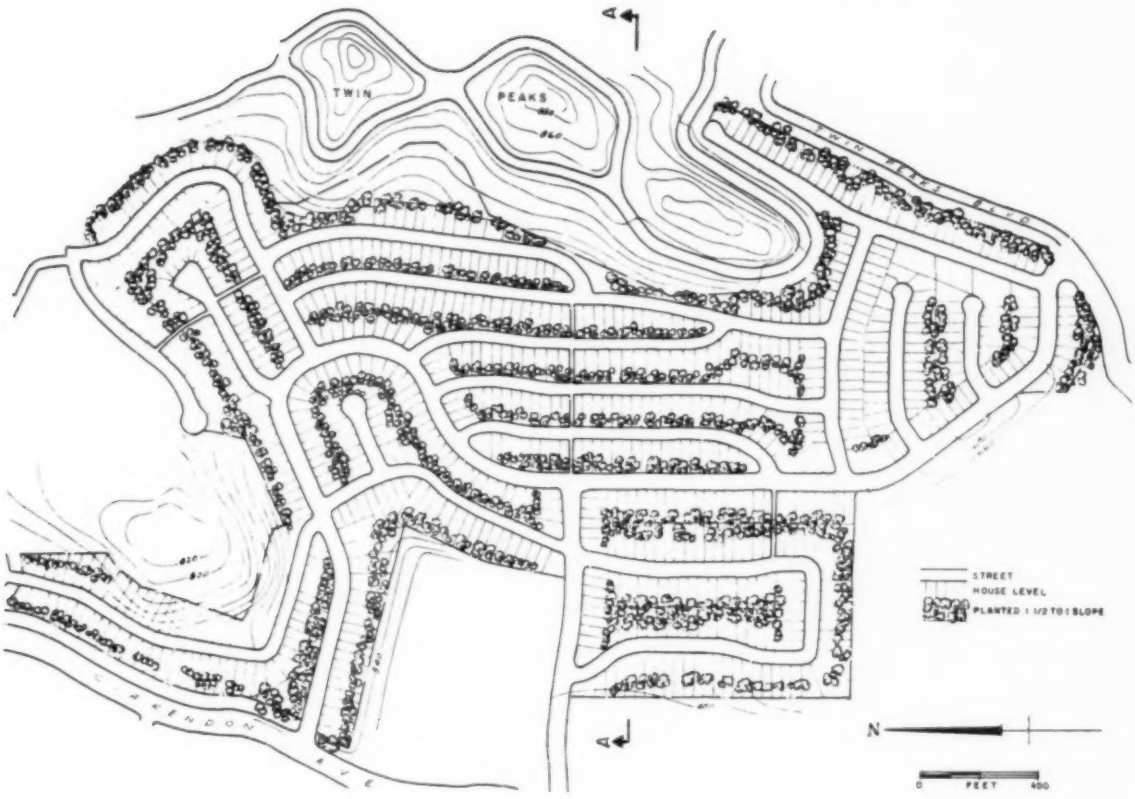
1. Ruth Jaffe, a staff member of the Department of City Planning, San Francisco, reports the havoc left by the giant caterpillar tractor "cat" in grading the hillsides of that city for housing development.

2. "You ought to see my big 'cats' move that dirt!" declared the proud engineer, his eyes shining across the table at the slightly less enthusiastic planners. The "cats" had been moving along the slopes of Twin Peaks in San Francisco, chewing out great chunks of mountain, leaving a series of wide, flat trails. San Francisco, the city of hills, has precious little vacant space for new houses, and most of that space is on the steep outer hills which have remained undeveloped until recently because of excessive costs. But now, armed with new powerful earth-moving equipment, the mass builders can plant endless rows of houses on practically any sort of steep terrain. The miles of ugly, bare, steep slopes are an undeniable eyesore, and the new home owners are baffled by the enormity of the job of landscaping them.

3. Call for Help. A small group from the neighborhood organization of home owners in Midtown Terrace Subdivision, in December 1957 requested the Department of City Planning to advise them how to solve this problem. This subdivision covers about 100 acres and has more than 700 homes on lots 33 feet wide by 80 or more feet in depth. The grade of the original wooded hillside was about 40 per cent. Most of the streets are 40 feet wide, running parallel to the contours with single frontage on the down side and 1.5:1.0 slopes between frontage and the street below; or, in some areas, between houses.

4. The initial report presented the basic concept of an over-all comprehensive landscape plan without regard to individual property lines, or even plant preferences. The report was supplemented with instructional talks before substantial portions of the owners to help them visualize the possible result of a planned landscape treatment on their slopes and to persuade them to participate as a co-operative. The entire job of installation was completed in less than six weeks. The contract also called for a four month period of watering, maintenance and replacement of all plant failures. The cost of installation and four months' maintenance was less than $4 per plant, including contractual costs; an assessment of $20 per family would cover this.

5. Should the Subdivider Do This? The time may be approaching when this kind of landscape treatment will be installed by the subdivider as an integral part of the development. Even now, several are observing more advantageous methods of land planning--variation of lot size according to grade of slope; conservation of land forms, trees, and other natural landscaping.



A section of the development just before planting

Spence, Basil

REDEVELOPMENT IN THE GORBALS, GLASGOW

Basil Spence is one of the best known British architects who attracted worldwide attention when he won a competition for the rebuilding of Coventry Cathedral. His present article describes his humane and imaginative rehousing project for a particularly notorious slum district of Glasgow.

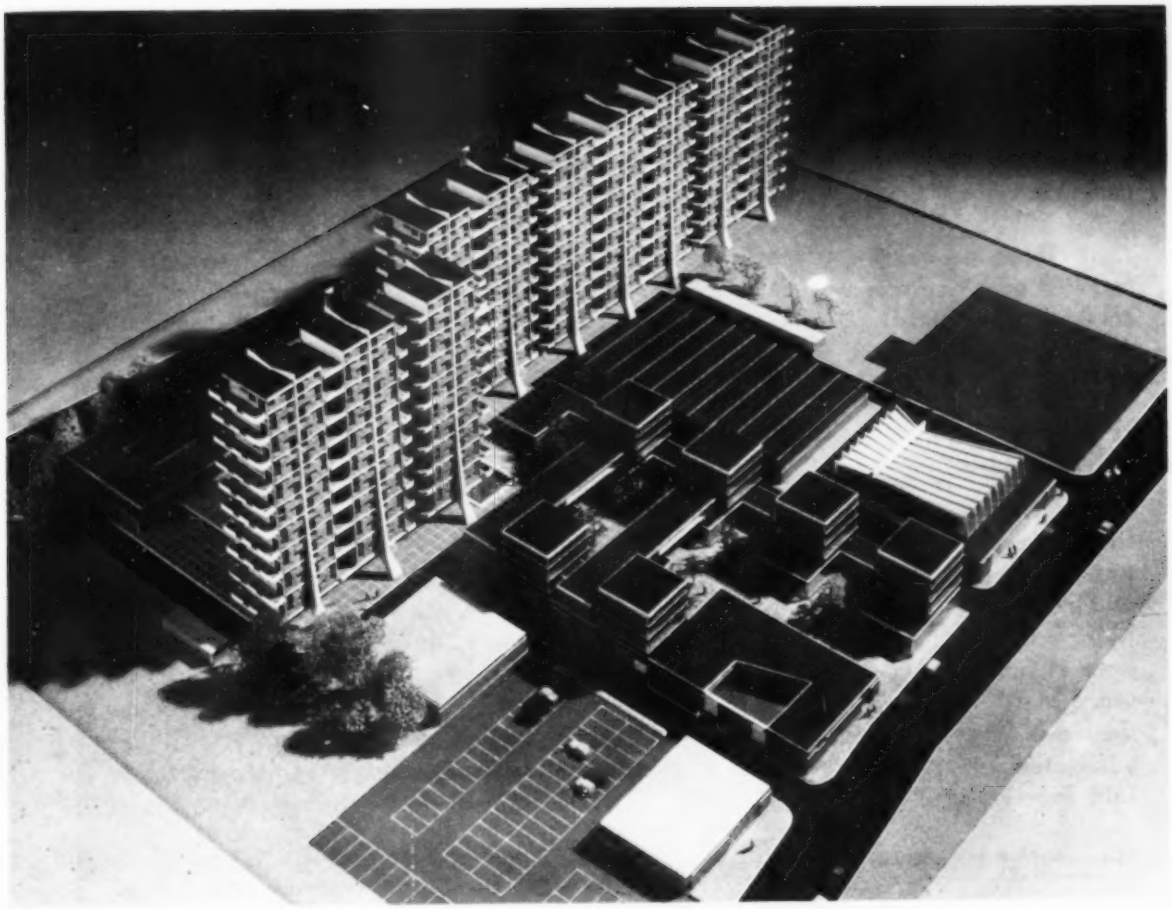
In the Hutchesontown and Gorbals wards of the City of Glasgow are some of the worst housing conditions in Europe. Glasgow Corporation (City Architect A. G. Jury, F.R.I.B.A., F.R.I.A.S.) have created the Hutchesontown/Gorbals Comprehensive Development Area to combat this gigantic problem. In twenty years some sixty-two acres of slums and decaying property will be demolished and replaced by a mixture of new high and low density housing, shopping and commercial centres, light industry, buildings for entertainment, schools, nurseries, etc. Some buildings, e.g., churches, are being retained.

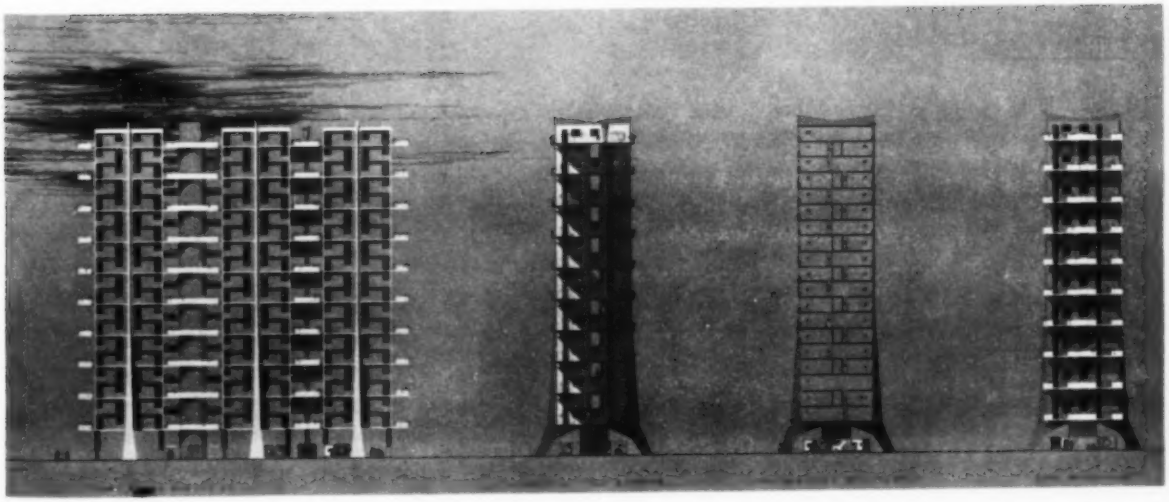
It is the Third Development of the first five years phase of this plan that Basil Spence was commissioned to design. His briefing was, on the fifteen acre central site of the whole area, to provide:-

> Housing in multi-storey blocks; a shopping and commercial centre; a cinema; a police station; three 'pubs'; a bank; a post-office; doctors' surgeries; two cafes; lock-garages; an electricity sub-station.

Mr. Spence envisaged the multi-storey housing as one great block forming the visual and social core to the whole Gorbals, with the shopping and commercial centre as a totally pedestrian unit, having direct access from the big block. He developed this idea and produced the twenty-storey block of four hundred houses, each with its own garden. This has been achieved by adopting a cross-over maisoneete plan, where all living rooms face southwest and all bedrooms face northeast, in a series of towers, each tower being joined to the next by a garden slab at every second floor. The "block" in fact became two blocks, one of three towers, and the other of seven towers, but visually it remains one.

The provision of a garden of twenty feet by ten feet to every tenant in a multi-storey development is a complete departure from anything previously done in Britain, and the aim is to "humanise" this type of living. The garden can be used for drying clothes (the tall blocks on Monday washday looking like "a great ship dressed overall"), growing tubs of flowers, sunning the baby, and, as the garden slabs are shared sometimes between two or sometimes between four tenants, chatting to the next door neighbour over the garden fence. This extra open air space is very necessary to what must, of cost necessity, be





tightly planned houses, and is visualized as an extension and a nurturing of the strong community spirit that is a very real feature of the present Gorbals slums.

Glasgow Corporation have courageously accepted in principal this bold architectural and social experiment. Some 1280 persons are to be housed in the staggered twenty-storey block, the ground floor of which has been left open and free, except for small bin housings and stores, to provide covered play area for children, and allow easy pedestrian movement through the shopping centre.

Three towers, one in the small block, two in the large block, each containing two lifts and a staircase give access to the main corridors on every second floor. These corridors are naturally lit as they span across the garden areas, and have the appearance of being slung under the garden slabs.

House Types

Floors 1, 2 and 3 contain forty-four apartment houses (Types C and D, living room, dining/kitchen, three bedrooms and bathroom), and twenty single apartment flats (Type E, living room, open bedroom, kitchen and bathroom), for old people. Floor 3 has another twenty old people's single apartments and the entrance level to a three apartment house on Floor 5. Floors 5 to 18 inclusive provide three apartment houses (Types A and B, living room, dining/kitchen, 2 bedrooms and bathroom), three hundred in all. The top floor 19 has twenty single apartments (Type F) for younger people. Good storage is provided in all the houses, and all the three and four apartment types have pram storage at their own level, and near their own house doors. All bathrooms are naturally lit and ventilated to the gardens. The houses have been designed according to the standards laid down by the Department of Health for Scotland.

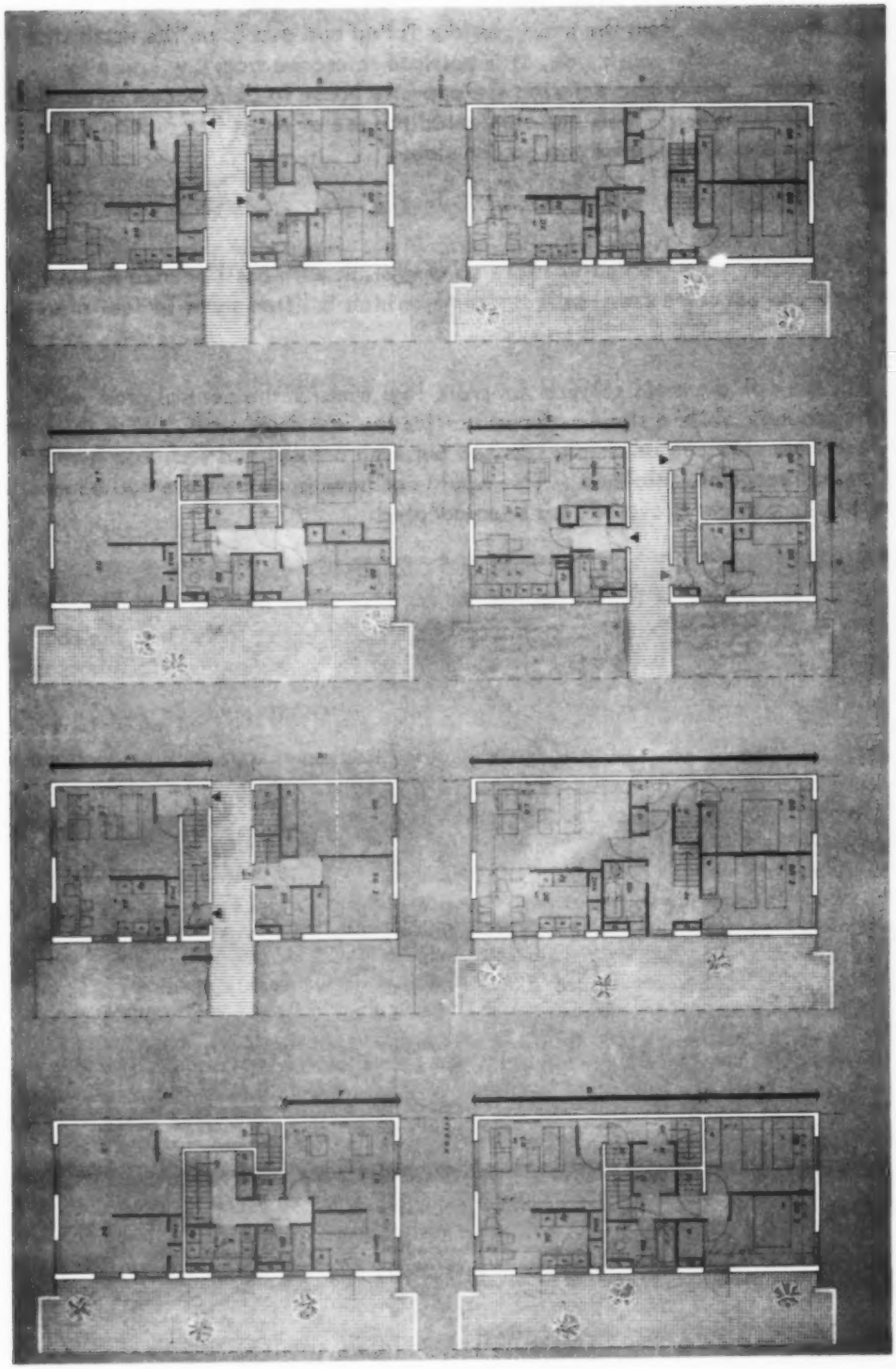
Heating, et cetera

The living rooms and main circulation areas of all the houses are to be heated by underfloor electric embedded cables under the control of each tenant, and electricity is to be used throughout for cooking and water heating.

Refuse Disposal

It is proposed to use dry chutes discharging into bins which are collected at intervals at ground level by the Corporation Cleansing Department. This system, generally acknowledged in Britain to be the most economical, has been used extensively by the London County Council and other Authorities doing multi-storey work.

The chutes are to be located in the centre of every garden--so eliminating a certain amount of noise nuisance--with hoppers at garden and corridor level. Incinerators are also to be provided in the stair towers on every floor.



LEGEND

HOUSE TYPES

NOTE

SCALE

Fire Escapes

Since access to houses from the main corridor is "up and over" on the north side, and "down and under" on the south side, it is possible to escape from any house by crossing the garden diagonally and entering the opposite house to gain access to another main corridor in another tower. This has eliminated the use of extra fire escape stairs and provides yet another function for the garden slabs.

Construction

Engineer Ove Arup has worked in close co-operation with Basil Spence to evolve the in-situ reinforced concrete cross-wall structure, which is lifted some 14 feet clear of the ground.

In each tower two dramatic splayed concrete legs transfer the central cross-wall loadings to the ground, while a simple support carries the end cross-wall. With this method the first-floor slab can be simply spanned between central and end cross-walls and be of a normal economic thickness. This would not have been possible had a more conventional pilotis and cantilevered slab been adopted.

The Shopping and Commercial Centre

A pedestrian road lined on either side with alcoves of shops, leads from the south to a large plaza over which straddles the big block. Above the shops rise six towers of four storey office accommodation and the pedestrian way is bridged over by two cafes. On the north of the plaza there is grouped some two storey shops, doctors' surgeries and a pub. Another pub lies to the east of the service road to the main shopping street and to the west separated again by the service road, is located a block of light service industry and the cinema.

Work on the site ought to commence in 1960 and the twenty-storey block will probably take about three and a half years to complete. The Quantity Surveyors are Messrs. Reynolds & Young, London.

Waters, E. H., Hosking, J. S., and Hueber, H. V.
TESTS FOR POTENTIAL AND PAST MOISTURE EXPANSION OF CERAMIC BUILDING UNITS
American Society for Testing Materials Bulletin, April, 1960. Number 245.
Pages 55-59. Illustrations. Bibliography.
666.7: 624.012.8 (100)

1. Three members of the Commonwealth Scientific and Industrial Research Organization of Australia have collaborated in the research behind this paper. E. H. Waters is in charge of investigations into wall and floor surfacing materials; J. S. Hosking and H. V. Hueber initiated research into moisture expansion of heavy clay. Mr. Hosking is currently on loan to the Illinois State Geological Survey, Urbana, Illinois, where he is investigating the comparable behavior of American clays.

2. Although it has long been known that burnt-clay products in contact with water or humid air slowly expand and that most of this expansion is not lost by drying at ordinary atmospheric temperatures, it is only relatively recently that it has been recognized that this expansion of clay building units can cause serious structural damage. Over the past few years many examples of damage to brickwork in Australia caused by such expansion have been brought to the attention of the authors, and communications received from abroad indicate that it is by no means uncommon in England, Canada, and South Africa. In the laboratories of this Division, hundreds of bricks have been examined, representing the different raw materials and brick-making processes in and around the cities of Melbourne, Sydney, and Adelaide (major centers of brick production in Australia) and, although the results vary widely, every brick examined has been shown to be capable of permanent moisture expansion.

3. From our field and laboratory observations it seems likely that much cracking of clay masonry and lifting of wall and floor tiling, which in the past has been attributed to other causes, is in reality a result of the moisture expansion of the burnt-clay units. It is therefore important to have a means of estimating both the potential future expansion of a brick or tile and, in cases where damage has occurred, the expansion which has already taken place.

4. Estimation of Potential Future Expansion. The expansion of several hundred bricks has been studied, both standing in a normal atmosphere and in saturated steam at 200 C. The results of these measurements are summarized in Figures 1 and 2 (Page 60) where the brick types represented are:

Type A - red stiff plastic, made from Silurian shales, mudstones and sandstones, with some admixture of their weathered surface clays

Type B - cream stiff plastic, made from a mixture of Tertiary white clays, with some of the weathered material used for making the former.

Type C - wirecut (stiff-mud), made from either Silurian or Triassic shales, etc., mixed with their own surface weathered clay or clays of Tertiary or more recent age.

Types D and E - semidry press facing and common, made from Triassic shales and their overlying weathered surface clays, with more surface clays in the facing than in the common types.

Most of the bricks examined had expanded by more than 0.05 per cent after exposure to the laboratory atmosphere for six months, and after exposure for five years most had expanded by more than 0.1 per cent.

5. The universality of the expansion of burnt-clay products in contact with moisture and the large expansions observed make it clear that it will not generally be practicable to accept or reject burnt-clay building units according to their potentiality for expansion. All expand, and most to such an extent that allowance for this expansion must be made if structural damage is to be avoided. What is required then is not so much an acceptance test but rather a means of providing the designer of the structure with data which he can use in making allowance for future expansion of bricks or tiles.

6. If an accelerated test such as the autoclave test is to be used in this way, it must fulfill one of two criteria: either the relationship between the expansions produced under test conditions and those occurring naturally must be known with sufficient precision to enable the latter to be calculated directly from the former, or it must be known that the relationship is constant. However, it has been found that although autoclave treatment produces accelerated expansion, this probably happens, at least to some extent, by substituting other reactions occurring at lower temperatures. It is therefore not unreasonable that there is no precise correlation between the expansions produced under the two conditions. The autoclave test consequently does not form a sound basis for a quantitative estimate of the probable future expansion of burnt-clay building units.

7. Estimation of Past Expansion. The position appears to be that while some bodies will lose their moisture expansion at relatively low temperatures (even below 300 C), others require very much higher temperatures to do so, some retaining almost half their expansion after heating to 950 C. On the other hand, heating to temperatures approaching the original firing temperature, may produce a contraction greater than the original expansion. It therefore does not appear possible in our present state of knowledge to nominate a heat treatment schedule which can be guaranteed to return a moisture-expanded body to its ex-kiln dimensions. An extensive series of experiments on a wide range of bodies expanded both naturally and in the autoclave, and whose ex-kiln dimensions are known, will be necessary and such an experimental program is to be started shortly.

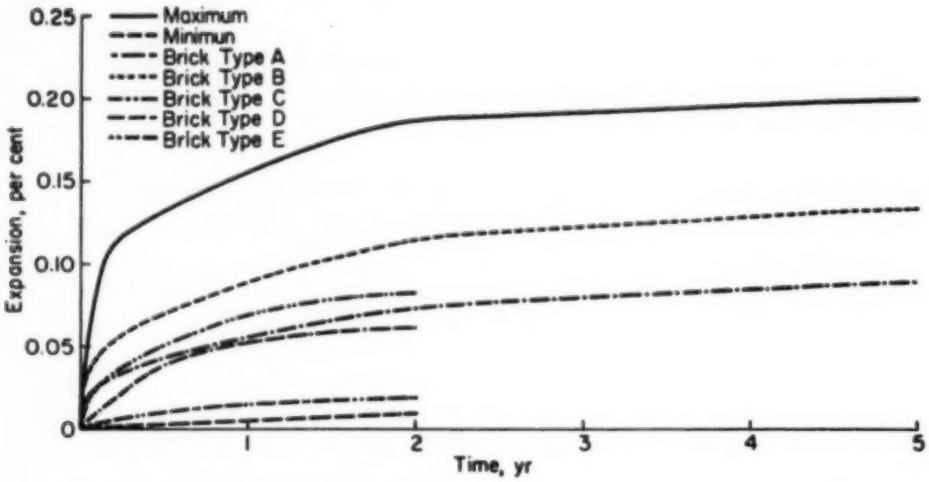


Fig. 1.—Mean moisture expansion curves for five types of brick from Melbourne and Sydney together with the over-all maximum and minimum expansion curves for all bricks examined on standing in an air-conditioned laboratory (21 C 50–65 per cent relative humidity).

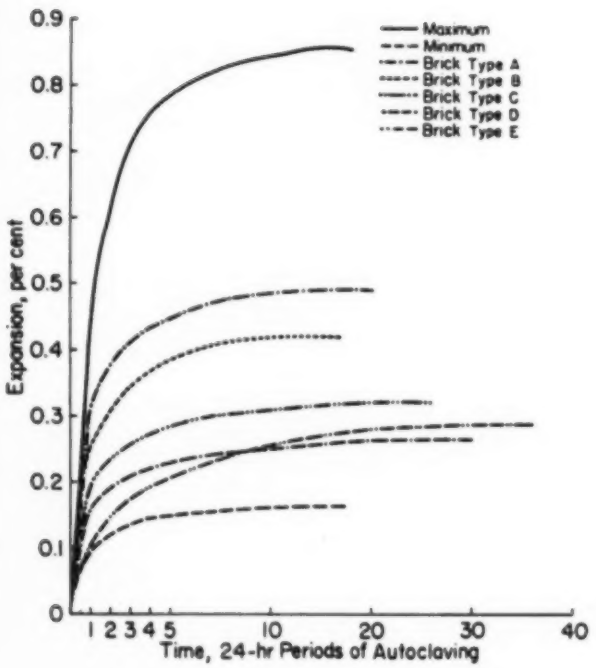


Fig. 2.—Mean moisture expansion curves for the same five types of brick shown in Fig. 1, together with the over-all maximum and minimum expansion curves for all bricks examined on drying at 100 C after autoclaving in saturated steam at 200 C.

8. Conclusion. The universality of the expansion of burnt-clay products once they leave the kiln, and the magnitude of the expansions commonly observed in bricks and similar burnt-clay building units, makes the use of an acceptance test based on their potentiality for expansion impracticable. Allowance for this expansion must be made in the design of the structure and the way in which the bricks are used.

9. The autoclave test is not a staisfactory means of determining what allowance should be made. Although it produces an accelerated expansion which is related in a general way to that which occurs when the units are simply left to stand in a normal atmosphere, the correlation between the two is not good enough to enable one to be satisfactorily estimated from the other. A probable reason for this is that the reactions causing expansion in the autoclave are not solely those causing expansion at room temperature. Design data on expansion can hence only be obtained by long-term studies on similar bricks or tiles.

10. Although an approximate idea of the amount by which an aged specimen has expanded can usually be obtained by reheating it, the effects of body composition and original firing temperature on the recovery of expansion in this way are such that in some cases it has proved impossible to remove expansion without heating to temperatures approaching those at which the specimens were originally fired. At these temperatures, further firing shrinkages occur and the two effects become confused; this suggests that even at lower temperatures the shrinkage obtained by heating is not necessarily wholly caused by a reversal of the expansion process, and hence any approximate numerical agreement may be quite fortuitous.

International Labour Conference
WORKERS' HOUSING
International Labour Conference, Forty-fourth Session 1960, Geneva, International Labour Office, 1959. Report VIII (1). 84 pages. Report VIII (2) 1960. 238 pages.
333.32 (100)

1. Two reports which have been prepared by the International Labour Office for the International Labour Conference to be held during this year are abstracted. They set the stage for the likely results of this meeting. The first part of report VIII published in 1959 sets the problem, outlines various methods of tackling it, discusses economic policy and housing priorities anid possible international action. The second half of Report III, published in 1960, is the resultant of questionaires received from the Governments of the following 58 States: Afghanistan, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Byelorussia, Canada, Ceylon, Chile, China, Costa Rica, Czechoslovakia, Denmark, the Dominican Republic, Finland, the Federal Republic of Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, India, Iran, Iraq, Ireland, Israel, Italy, Japan, Luxembourg, the Federation of Malaya, Mexico, Morocco, the Kingdom of the Netherlands (Surinam), New Zealand, Nicaragua, Norway, Pakistan, the Philippines, Poland, Portugal, Spain, Sudan, Sweden, Switzerland, Thailand, Tunisia, Turkey, Ukraine, The Union of South Africa, the U.S.S.R., the United Arab Republic, the United Kingdom, the United States, Viet-Nam and Yugoslavia. The lengthy summaries of the 56 questions asked will not be abstracted. The general comments and conclusions derived from them are included here and EKISTICS hopes to follow this article up with an abstraction from the final report of this meeting.

THE NATURE OF THE PROBLEM

2. The Social Importance of Workers' Housing. Adequate shelter for himself and his family is one of the earliest needs of man, responding to a basic instinct. At no time in human history has this need been so acutely felt as at the present day, or more systematic attention paid to its fulfillment.

3. The true foundation of all good social, economic and political relationships is a happy people. Many things can help to compensate for poor housing conditions but they can never be real substitutes for what every man and his family should be enabled to enjoy, that is, a decent home and neighbourhood. The social instability of a country in which a large proportion of the people are poorly housed is bound to reveal itself sooner or later. Discontent over bad housing conditions can erupt into "squatters' campaign," strikes and other social disorders, and there is hardly a country in the world in which the housing problem has not become a fundamental issue.

4. In the modern industrial world the worker's need for decent housing within a reasonable distance of his place of work has become evident. When technological advances and the pressure of demand make it increasingly possible for giant industrial enterprises to spring up in places difficult of access the problem of workers' housing is given priority as a pioneering task. However, in the older urban and industrial centres, where slums have been tolerated for generations, unsatisfactory housing conditions often persist in an acute form. In these crowded tumbledown areas accidents and fires add their toll to that of ill-health.

5. Turning to another aspect of the problem, the role of good housing in achieving sound labour-management relations and improved labour productivity has not escaped the attention of enlightened management. A worker who comes from a home which is no more than a hovel and encounters the noise and stress of an industrial establishment is not likely to be in the best condition of body and spirit for the job before him. The frustrations of badly housed workers can lead to aggressive attitudes and their legitimate grievances form a constant source of unrest and agitation.

6. Workers' Housing as a Social Responsibility. The compilation of an inventory of world housing needs is no simple task; it cannot be accomplished with any degree of precision because of the three following factors.

a. The concept of minimum housing standards varies throughout the world. It is conditioned by a number of factors such as climate, level of economic development, availability of different types of building materials, density of population, family, religious, and cultural traditions, and the degree of social consciousness.

b. It would be impossible to measure statistically on a world basis because of the lack of sufficiently detailed information concerning the quantity and quality of existing housing.

c. There remains the problem of measuring the amount of new housing that is required each succeeding year to allow for the replacement of dilapidated and obsolete housing, the increase of population and the geographical movements of population. There is also the problem of measuring the world need for community facilities such as streets water and sewerage facilities, schools and health centres, places of worship, and recreational and shopping facilities which are required for proper and healthy community life.

7. The causes of the world housing shortage are manifold; but the most fundamental are the increase in world population, the growing concentration of people in urban and industrial areas and the general lack of developed resources available

for house building. From the workers' point of view, the crucial question is as follows: Can he, without being aided first find a dwelling and secondly rent or own decent housing by paying out a reasonable percentage of his earnings? A number of studies made on this subject unfortunately indicate that the answer in most cases is in the negative.

8. In no country can all workers afford to rent or own decent housing by paying what may be regarded as a reasonable percentage of their annual incomes. Assistance in many different forms is indispensable for the improvement of workers' housing conditions. Outside the four walls of the house, local governments and authorities have an even greater role in ensuring that the neighbourhood is well planned, that community facilities are available and that the community and town as a whole function efficiently.

METHODS OF PROMOTING WORKERS' HOUSING

9. The Role of Government. In formulating national housing programmes governments and public authorities have undertaken two major types of responsibility: direct and indirect. They have undertaken direct responsibility for building, owning and managing dwelling units. They have assumed indirect responsibility by offering many types of incentive and assistance to workers, trade unions, co-operatives, employers and private investors such as banks and insurance companies, for the building of housing.

10. The Role of the Building Industry. In spite of the considerable improvement in the efficiency of the building industry since the Second World War, construction costs still remain very high in most countries for the following reasons:

a. Each structure must be built on a separate plot of land creating technical difficulties which are not encountered in most other employments.

b. Economic instability which has plagued the industry during the past century has led employers and workers to resort to defensive restrictive practices which have driven up costs.

c. In most countries house building has by and large retained its traditional character of a craft industry carried on mainly by small-scale firms.

11. The improvement of efficiency in the building industry is a many-sided problem. Higher productivity has been achieved mainly through better planning; better organization of the work site; improvement in building materials; improvement in building methods; rational utilization of the labour force; improvement of workers' skills; improvement of management capacities; reduction of restrictive practices; and stabilization of the industry through sound labour-management relations.

12. The Role of Private Rental Housing. Although private rental housing played an important role in providing workers' housing before the Second World War, building costs have risen so much since the war that in most countries it has been unprofitable for private investors to build new rental housing for other than middle and upper income groups. In recent years, however, a number of governments have found it useful to stimulate private rental housing through the payment of subsidies and the adoption of other measures in order to minimize their responsibility for the construction and management of housing. There may well be, therefore, gradually increasing opportunities for private rental housing. In this connection, it may be noted that it was agreed at the European Regional Conference that "in the long run, and as a consequence of higher productivity, the relationship between wages, including family allowances, and rents should be such as to enable workers to rent modern healthy housing out of their own income, without public subsidies." It will take some few years to achieve this goal in Europe, and even longer in many other parts of the world.

13. The Role of Employers. The activity of employers for housing workers has been recognized, especially on the part of certain categories of employers, or of employers in isolated or underdeveloped areas of a country. The housing of industrial workers by enterprises located in centres of population has been rather a different matter. The physical necessity of some sort of provision by the employer is absent, since workers are already housed in one way or another. Nevertheless, bad living conditions are socially undesirable and in important factor contributing to instability and low efficiency of labour. From a humanitarian and a practical point of view, therefore, large-scale employers, particularly in the less industrialized countries have often provided housing for their workers in order to obtain a stable, efficient and satisfied labour force.

14. Employers have participated directly and indirectly in the provision of housing in several ways. by assuming responsibility in building, owning and managing housing estates; by participating in schemes promoted by state subsidies and tax policy; by making loans to workers who wish to own their own houses; by paying housing allowances; and by renting housing owned by local authorities.

15. Although providing a satisfactory solution to the housing problem in many instances, the policy of arranging for housing to be provided by the employer has raised many difficult questions, particularly in the less industrialized countries. Should employers have any responsibility at all for providing workers' housing? If so, should this be voluntary or compulsory? Should it cover employers in all industries or only in those such as mining, the petroleum industry and plantations, where frequently no local supply of labour is available? Should the employer be expected to subsidize workers' housing or should he be able to charge the full economic rent to the worker-occupant? Should the employer be compelled to use a part of his own capital for housing investment or merely be enabled to borrow the capital from the government? Should he be able to obtain tax concessions for

providing workers with housing? If an employer has constructed housing for his workers, additional management problems are encountered. Upon what conditions should he have the right to repossess the house in case of termination of employment of the occupant? What protection should be granted to the worker and his family against arbitrary eviction or the loss of investment which may, for example, have been made in standing crops or in improvements to the house?

16. The Role of Workers and Their Organizations. Workers have assumed responsibility for providing their own housing in many different ways and in many different degrees. In some of the highly industrialized countries home ownership is a cherished tradition and owner occupancy either through co-operative housing societies or on an individual basis is widespread. In other highly industrialized countries, and among many of the less industrialized, governments, employers and workers' organizations have taken a number of different measures to stimulate the extension of home ownership, particularly through self-help, aided self-help and co-operative housing societies. As the efficiency of the building and related industries continues to improve, and as individual incomes gradually rise with rising national income, workers will in time be able to assume increasing responsibilities towards providing their own housing.

ECONOMIC POLICY AND HOUSING PRIORITIES

17. Higher Priority for Workers' Housing. In order to give higher priority to workers' housing and, in fact to housing in general, governments have taken measures concerned both with physical and financial resources. They have sought to overcome the limitations of physical resources, such as manpower, materials, equipment and management, in so far as these affect the rate of construction of workers' houses, in three different ways: by imposing restrictions on luxury housing; by diverting resources from non-housing construction into workers' housing construction; and by expanding the resources of the construction industry either by diverting resources from other industries or by utilizing resources that previously were partially or totally unused or that have newly become available.

18. Housing and National Investment. In industrially mature countries, quite apart from the urgency of social need, there may be strong economic reasons for giving housing and related facilities a high priority. With the maintenance of full employment a primary objective of government policy in most countries, employment stabilization may be an increasingly significant factor. Furthermore, there is increasing recognition that if it is desired to maintain a highly dynamic economy in an industrially mature country, a steadily higher rate of investment in housing and related facilities must be attained.

19. Among the less industrialized countries the priority problem is much more complex than it is in the highly industrialized countries. There is far greater need to use the available construction resources on projects that are essential for the economic development of the country, including the expansion of the capacity of the construction industry itself. In fact a large investment of resources in uses which directly increase the productive

capacity of the country seems to be essential for the economic development necessary to achieve a substantial improvement in the standard of living, including better housing.

20. The less industrialized country which has given a high priority to housing, in the sense of developing its capacity to overcome the national housing shortage with the maximum speed, is concentrating on expanding the basic capital structure of the country in the immediate future, with a view to, at a later date, greatly expanding its rate of house building. On the other hand, the country which has given a high priority to housing from permanent materials in the immediate future is running the risk, unless large-scale foreign capital aid is obtained, of postponing indefinitely the time when it will be able to expand its rate of house building to a level that will enable it to overcome the national housing shortage. However, many of the less industrialized countries which are, at the present time, giving a higher priority to workers' housing constructed from short-life materials, have a further object in view. The mobilization of hitherto partially or totally unused resources in aided self-help housing programmes provides almost unlimited opportunities in villages and rural areas for increasing the quantity and improving the quality of housing and community facilities in the immediate future.

21. Workers' Housing Within the National Housing Programme. Although in many countries there has been little or no opportunity to give a higher priority to workers' housing by diverting resources from investment not connected with housing, there may still be opportunities of diverting resources from luxury housing to workers' housing. The view that, within the national housing programme, workers' housing should have a special priority on social grounds has gained wide support within recent years, particularly in the highly industrialized countries. It should be recognized, however, that although a diversion of resources from luxury housing to workers' housing may be socially desirable, there are often great practical obstacles to carrying out such a policy. It may be practicable to limit the amount of luxury permitted in a single house, even though not attempting to impose restrictions on the number of houses built for upper-income groups. Such a policy would narrow the contrast between standards for upper-income group housing and workers' housing and make the austerity policy as applied to the latter more acceptable. Moreover, if by limiting the amount of luxury permitted in a single house, a larger number are built, the over-all housing shortage is diminished, and by the "filtering-down" process some slight improvement of housing conditions is indirectly and in the long run achieved for the whole population.

22. Priorities Within the Workers' Housing Programme. From the social point of view all workers should be treated equally and housing should be provided first to those in greatest need, e.g., families with the largest number of children and groups such as squatters, refugees and slum dwellers in general. However, in practice, in setting up priorities within their workers' housing programmes, governments have adopted a pragmatic approach. It is common practice in many countries for governments to give first priority to the housing of their own employees and those of nationalized undertakings through public housing schemes and loan and subsidy

programmes for co-operative and individual ownership housing. An important result of such a policy is that the government sets a good example as an employer. A high priority is also often given to the housing of refugees and the rehousing of people living in shanty towns, where such problems have arisen that from the political and health points of view some kind of immediate remedial action must be taken.

23. In the highly industrialized countries the justification for the grant of an immediate higher priority for workers' housing constructed from permanent building materials is fairly widely recognized, and the policy trend in that direction quite well established. Among less industrialized countries, however, the situation is more complex, because they cannot afford to allocate, both in the immediate future and in the long term, a higher priority to housing built from permanent materials. The fairly well established policy trend is to give a higher priority immediately to housing built from short-life materials, utilizing aided self-help and mutual aid methods and, as regards housing built from permanent building materials, to adopt the long-term concept of a higher priority to housing generally--i.e., to concentrate in the present on developing the capacity of the country to construct housing and at a later date greatly to expand the rate of house building. There is, however, some feeling that, for social reasons, the short-run concept of a higher priority to workers' housing should be adopted, i.e., concentration on building more permanent houses in the present, giving correspondingly less attention to developing the capacity to increase greatly the rate of construction of houses and community facilities in the long term.

PROPOSED CONCLUSIONS

24. Form of the International Instrument. An international instrument concerning workers' housing should be adopted in the form of a Recommendation.

25. Definition and Scope. The instrument to apply to the housing of the following categories of workers:

a. wage earners;
b. salaried employees;
c. independent workers; and
d. persons who obtain their living from the land.

26. Objectives of National Housing Policy. It is to be an objective of national policy to promote construction of housing and related facilities with a view to ensuring that decent housing accommodation is made available to all workers and their families.

27. National Housing Programmes.

a. Each country to have a central body responsible for studying and assessing housing and related needs and for formulating long-term and short-term national housing programmes with determined targets.

b. National housing programmes to aim at ensuring, consistently with other national goals and within the limits set by housing and related needs, that all the private and public resources which can be made available for the purpose are co-ordinated and utilized for the construction of housing and related facilities.

c. There to be adequate scope for private, co-operative and public enterprise in house building, in so far as is consistent with the practices of the country.

d. In establishing and carrying out workers' housing programmes, special consideration to be given to the amount of the worker's income, the size of the worker's family, and the age of the worker. In addition, particularly in developing countries, special consideration to be given to workers employed in industries which are of great national importance.

e. The general aim to be--

1. to construct workers' housing and related facilities in the most suitable materials available; and

2. to adopt and pursue a programme which will lead to maximum improvement in workers' housing conditions as quickly as relevant considerations--such as available national resources, stage of economic development, technology and priorities competing with housing--permit.

f. In general, and in localities where employment opportunities are not of a temporary character, construction of housing and related facilities to be carried out in durable materials.

g. In certain countries, especially the less industrialized, particular consideration to be given to schemes, such as large-scale aided self-help schemes for short-life housing, which offer rapid, though temporary, improvement in housing conditions by having recourse to local reserves of unskilled labour and by utilizing locally available materials requiring little processing and other resources which may be in plentiful supply in the country.

h. All public authorities having some responsibility relating to housing, or certain aspects thereof, to be associated with the preparation of national housing programmes.

i. Employers' and workers' organizations concerned to be associated in the preparation of national housing programmes.

28. Housing Standards.

a. As a general principle, the competent authority should, in light of local conditions, establish minimum housing standards in order to ensure reasonable levels of decency, hygience and comfort and take appropriate measures to enforce these standards.

b. These standards to relate in particular to--

1. the minimum size and number of rooms or minimum space per person or per family;

2. adequate sewage and garbage disposal systems, and the supply of safe water into the worker's dwelling or in the courtyard thereof in such ample quantities as to provide for all personal and household uses essential for sanitation, cleanliness and comfort,

3. appropriate protection against heat, cold, damp, noise, fire and disease-carrying insects; and

4. adequate sanitary and washing facilities, ventilation, cooking and storage facilities and natural and artificial lighting.

c. With a view to promoting the well-being of the inhabitants, workers' accommodation to provide at least a minimum degree of privacy, taking into account the customs and traditions of the community.

d. Rooms devoted to living purposes to be suitably separated from quarters for animals.

e. Where housing accommodation for single woekrs or workers separated from their families is collective, the competent authority to establish housing standards admitting of inter alia, a separate bed for each worker and separate accommodation of sexes; and providing for adequate water supply drainage and sanitary conveniences, heating and ventilation as appropriate, and, where not otherwise available in the community, common dining rooms, canteens, rest and recreation rooms and health facilities.

f. Housing standards to be revised from time to time to take account of economic development and increases of real income per head.

29. Financing--General Principles.

a. The objective to be that the worker can rent or own decent housing without spending more than a reasonable proportion of his income thereon.

b. Public authorities to endeavour to ensure that facilities for public and private loans are available on reasonable terms to workers who want to own their homes. Such loans to cover all or substantial part of the initial cost of the dwelling unit, and facilities to be provided for their repayment over a long period of time.

c. National mortgage insurance systems or public guarantees of private mortgages to be established, where appropriate, as a means of promoting the building of workers' housing.

d. The competent authorities, as appropriate, to supplement public and private loan facilities by other methods of direct financial assistance, such as grants or tax concessions, to individual workers, co-operative societies, employers or local authorities.

e. In the case of direct financial assistance, the recipient to accept the greatest possible degree of financial responsibility and participation.

30. Private (Individual and Co-operative) Housing.

a. Appropriate measures to be taken in accordance with national practice--

1. to stimulate saving by individuals, co-operative societies and private institutions which can be used to finance workers' housing; and

2. to encourage investment by individuals, co-operative societies and private institutions in the construction of workers' housing.

b. Co-operative housing societies particularly merit encouragement by governments and employers' and workers' organizations.

c. All appropriate measures to be taken by governments, employers, and employers' and workers' organizations, to encourage and assist home ownership by workers, and, in particular, self-help housing schemes; such measures might include, for example--

1. the provision of technical services, such as architectural assistance;

2. maintenance of facilities for research in housing and building materials and publication of the results thereof;

3. training in simple building techniques required for self-help housing;

4. the provision of equipment, materials or tools for sale or hire at less than cost;

5. reduced interest rates and other concessions;

6. the sale of land at less than developed cost and long leases of land at nominal rents;

7. direct financial subsidies towards the initial capital outlay.

31. Public Housing.

a. Public authorities, to the extent required and as far as practicable, to assume responsibility for providing workers' housing directly.

b. Public authorities to have the power:

1. to acquire land at a fair price for workers' housing and related facilities; and

2. to acquire, in appropriate cases, land reserves in order to facilitate advance planning and construction of public housing and related facilities for workers.

32. Housing Provided by the Employer.

a. Employers may be required or encouraged to provide accommodation for their workers, in particular when a plant is situated far from a centre of available labour or when the residence of certain categories of workers near the employer's premises facilitates the proper performance of their duties.

b. In cases where housing is provided by the employer--

1. the employer to be entitled to repossess the accommodation within a reasonable time in the event of termination of the worker's contract of employment;

2. the worker or his family to be entitled to a reasonable period of continued occupancy in the event of termination of his employment, as well as in cases of sickness, incapacity or death; and

3. the worker, in the event of termination of his employment, and of his being obliged in consequence to vacate housing premises, to be entitled to receive fair compensation for crops that he is growing on land belonging to the employer.

c. A worker occupying housing provided by his employer to endeavour to ensure that wear and tear of the premises is kept to a minimum.

d. Persons having social relations or business, including trade union business, with the occupiers of employer-provided dwellings to be entitled, subject to reasonable conditions, to free access to the housing areas.

e. The wages of workers housed by their employers to be in principle fixed at, or where necessary, adjusted to, a level which will enable the workers to pay a fair rental and a reasonable charge for services provided, such as heating and lighting.

f. Where appropriate, the possibility to be examined of the worker-occupants or failing them, a public authority, taking over control or ownership of employers' housing schemes, with fair compensation.

33. Measures to Promote Efficiency in the Building Industry.

a. Government and employers' and workers' organizations to take active steps to achieve the most efficient use of resources in the building and associated industries and where necessary, to encourage their development.

b. Workers' housing programmes to be carried out on a long-term basis in order to obtain the economies of continuous operation.

c. Appropriate measures to be taken for improving and, where necessary, expanding facilities for the training of skilled and semi-skilled workers, supervisory personnel, contractors and professional personnel, such as architects and engineers.

d. Where there is a shortage of building materials, tools or equipment, consideration should be given to such measures as giving priority to

the construction of factories producing these goods, importing equipment for such factories and increasing trade in these goods.

e. Having full regard to considerations of health and safety, building codes and other regulations pertaining to design, materials and construction techniques, to be so formulated as to permit the use of new building materials and methods, including locally available materials and methods, including locally available materials and self-help methods.

f. Special attention to be given, among other measures, to improved planning and organization of work on the site, to greater standardization of materials and simplification of working methods and to the application of the results of building research.

g. Every effort to be made with a view to eliminating such restricitve practices on the part of contractors, building material suppliers and workers' organizations in the building industry as may exist.

h. Every effort to be made to promote the efficiency of small-scale building contractors, for example by placing at their disposal information on low-cost materials and methods of building, by the provision of centralized facilities for hiring tools and equipment and by specialized training courses.

34. House Building as an Employment Stabilization Measure.

a. Appropriate measures to be taken by governments and employers' and workers' organizations to reduce seasonal unemployment in the building industry, such as--

1. the use of improved machinery and construction techniques;
2. the use of newly developed products to protect materials from weather;
3. education of those concerned regarding the technical feasibility and social desirability of not interrupting building in unfavourable climatic conditions;
4. the payment of subsidies to offset in whole or in part additional costs which might be involved in construction under such conditions; and
5. the timing of housing programmes so as to help to reduce seasonal unemployment.

b. National housing programmes to be planned so as to permit of the speeding up of the construction of private and public housing and related facilities in the event of a slack period or, within limits determined by the urgency of housing needs, its slowing down in periods of inflationary pressure.

c. In periods of declining private construction or declining economic activity in general, and in cases where there is a need for further construction, the government to make some provision for financial assistance to local authorities for the construction of workers' housing and related facilities.

d. Measures for increasing or decreasing the volume of private housing might include changes in the rate of interest, the length of the amortization period and the size of down payment required.

e. Where there are considerable numbers of unemployed in the construction industry, or even outside it, the programme of construction of workers' housing and related facilities to be expanded to offer employment to as many unemployed persons as possible.

f. Appropriate steps to be taken, where necessary, to ensure administrative and financial co-ordination between the various central and local public authorities and between them and private bodies in carrying out an employment stabilization programme affecting the construction of workers' housing and related facilities.

35. Rent Policy.

a. In countries with a sufficiently high standard of living, the long-term objective of rent policy to be that rents actually paid should gradually tend towards covering the economic cost of the dwelling, including interest and depreciation on capital invested insurance and taxes, in order to obtain an efficient utilization of existing housing accommodation and maintain a standard of housing in accordance with the capabilities of the country.

b. During periods of acute housing shortage measures to be taken to prevent an excessive rise in rents of existing workers' housing; as housing shortages are eased, controls over rents to be relaxed.

36. Town and Country Planning.

a. The development and execution of workers' housing programmes to conform to sound town and country planning practice.

b. Workers' dwellings, in so far as practicable and taking into account available public and private transport facilities, to be within easy reach of places of employment, and in close proximity to community facilities such as schools, shopping centres, recreation areas and

facilities for all age groups, religious facilities and medical services and, subject to the foregoing, to be so sited as to form attractive and well-laid-out neighbourhoods.

c. The siting of housing should take into consideration the possibility of air pollution from factories, and topographical conditions which may have an important bearing on the disposal of surface run-off and of sewage and other wastes.

d. In the construction of short-life housing, it is particularly important to ensure community planning and control over density of occupancy.

e. It is desirable to adopt the principle of providing in towns and cities for separate but inter-related zones, such as residential, commercial and industrial zones, with a view to ensuring as agreeable an environment as possible for the worker and his family and to minimizing the time spent and risks incurred by workers in going to and from work.

f. In order to lessen overcrowding in big cities it is desirable to promote a policy of urban decentralization by the development of satellite towns and of new sites likely to attract some of the industrial and commercial undertakings located in cities.

37. Workers' Housing Policy and National Economic Policy

a. Large-scale production of permanent housing, particularly in the less industrialized countries may compete directly with overall programmes for economic growth and development, since scarce skilled or semi-skilled labour and scarce resources--for example building materials such as cement and steel--may be needed for housing as well as for other types of production required to expand productive capacity. In such cases, housing policy to be co-ordinated with general social and economic policy so that workers' housing may be given a degree of priority which will take into account both the need therefor and the requirements of balanced economic development.

b. Where a substantial permanent expansion of house-building capacity is required in order to meet national needs on a continuing basis, economic development programmes to aim at ensuring that in the long run the skilled manpower, materials, equipment and finance required for house building are available in sufficient quantities.

RECENT PUBLICATIONS

Acquah, Ioné
Accra Survey: A Social Survey of the Capital of Ghana, formerly called the Gold Coast, Undertaken by the West African Institute of Social and Economic Research, 1953-1956. London, University of London Press, Ltd. 1958. 176 p. Photos. Plans. Tables. (£2.10.0)

American Society for Testing Materials
Standards on Methods of Atmospheric Sampling and Analysis D22. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 116 p. ($2.25)

Bezy, Fernand
Principes pour l'orientation du développement économique au Congo. Studia Universitatis "Lovanium." Institue de recherches économiques et sociales, 1. Leopoldville, Editions de l'Université, 1959. 56 p.

Dandekar, Kumudini
Demographic Survey of Six Rural Communities. Poona, Gokhale Institute of Politics and Economics, Asia Publishing House, 1959. 142 p.

Food and Agriculture Organization, United Nations
Project de développement méditerranéen. Développement agre-sylvicole et expansion économique dans les pays méditerranéens. Plan d'action pour un développement intégré. Rome, 1959. 227 p. ($2.)

Hershalg, Z. Y.
Turkey, An Economy in Transition. The Hague, Uitgeverij van Keulen n. V., 1958. 340 p. (55s.)

International Confederation of Free Trade Unions, Asian Regional Organization.
An Outline of Plantation Economy in Asia. New Delhi, 1958. 140 p. (3 rupees) (4s.) (75 cents) ($2 Malayan).

Ledermann, Alfred, and Trachsel, Alfred
Creative Playground and Recreation Centers. Frederick A. Praeger, 64 University Place, New York 3, N.Y. 1960. Illustrations. Plans. ($12.50)

Meyer-Bohle, Walter
Vorgefertigte Wohnhäuser (Prefabricated Houses). George D. W. Callwey, Munich, 1959. 96 p. Illustrations. Plans. Photographs. (DM. 19.50)

RECENT PUBLICATIONS
(continued)

National Council of Applied Economic Research, New Delhi.
Rehabilitation and Development of Basti District: A Case Study in the Economics of Depressed Areas. Bombay, (etc.) Asia Publishing House. 1959. 151 p. Tables. Forms.

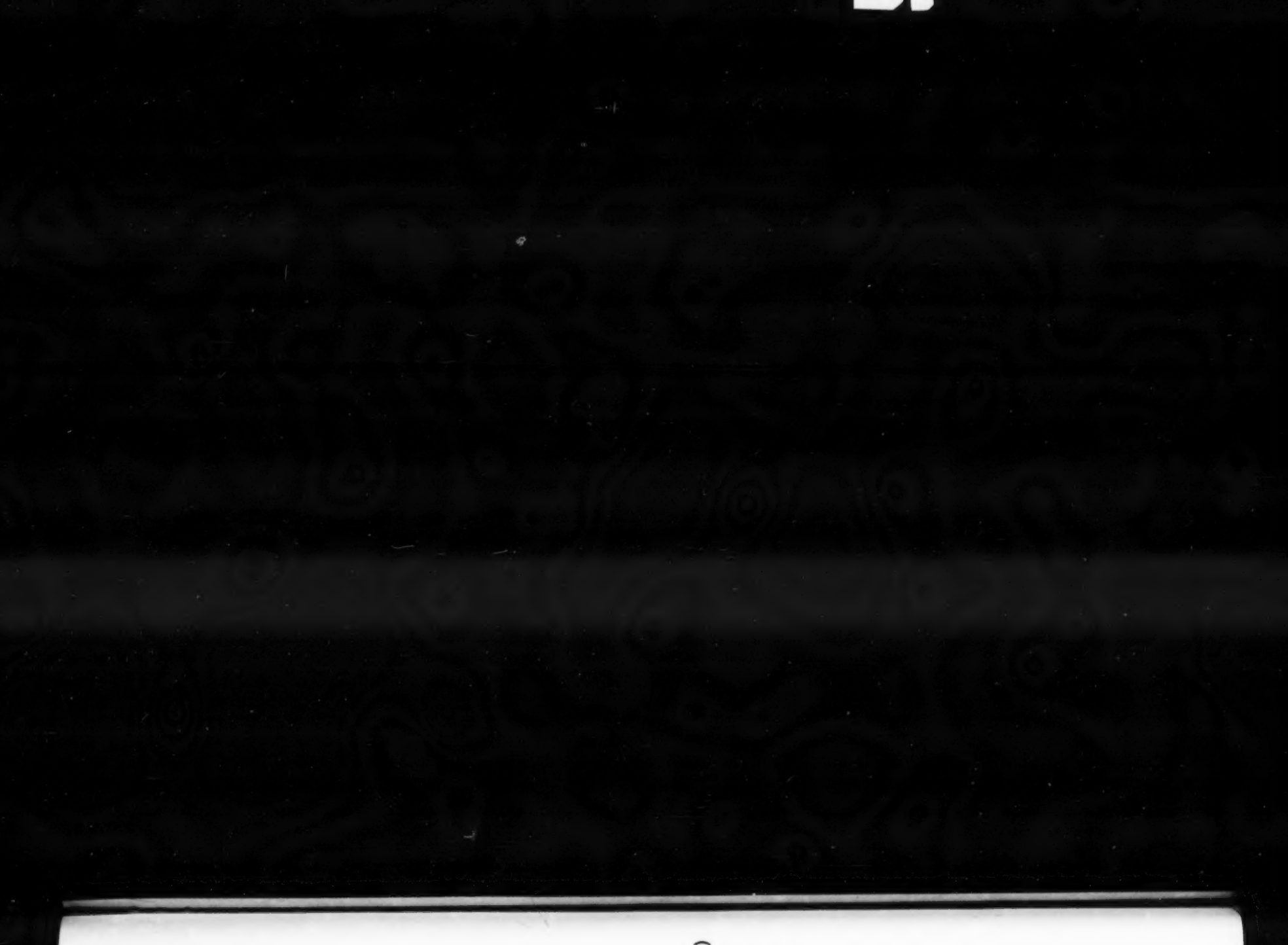
National Planning Council, Ceylon
The Ten-Year Plan. Colombo, Planning Secretariat, 1959. 490 p.

Sansom, R. C.
Organization of Building Sites (European Productivity Agency Project No. 302/1). National Building Studies. Special Report No. 29. Department of Scientific and Industrial Research (Building Research Station). London, H. M. Stationery Office. 1959. 186 p.

Snavely, J. Ernest
Farm Homes, Buildings and Utilities for Iraq: A Textbook Having as a Basis the Climatic Conditions, Construction Materials and Traditions Found in the Middle East. Baghdad, Ar-Rabitta Press, 1959. 186 p. Photos, plans, diagrams, tables.

Vincelli, Guido
Una communitá meridionale. Turin: Casa Editrice Taylor. 1958. 260 p. (L. 1,200)

Youngson, A. J.
Possibilities of Economic Progress. Cambridge, University Press, 1959. 325 p. (32s. 6d.)



THE PUBLICATION of EKISTICS was started in the Autumn of 1955.

THE IDEA behind it was to supply members of Doxiadis Associates in remote field posts and U.N. Technical Assistance experts working overseas, with a timely selection of abstracts from international journals, papers and books upon the broader aspects of housing and planning.

THE TITLE EKISTICS comes from the Greek verb OIKO, meaning settling down, and demonstrates the existence of a science of human settlements conditioned by man, influenced by economics, sociology, geography and technology.

THE CONTENTS are derived in large part from protected materials and may not be reprinted in whole or in part without the permission of the respective authors.

EKISTICS has become a means of developing interest in this more comprehensive approach to the problems of human settlements. It is addressed to all those interested in the planning and building of better settlements.

CIRCULATION is either.

In exchange for other related publications issued by academic or professional organizations,

or

on a subscription basis; the annual subscription being $15 or its equivalent.